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Enhancing the mechanical properties of concrete structures subjected to explosives impact using non-metallic geogrids

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Abstract

The strengthening and retrofitting of existing reinforced concrete structures against blast or projectile loadings is a pressing problem in the current political environment. The usual approach to protect sensitive structures is generally in the form of establishing a barrier line away from the structure. Although this approach can be quite effective, it still does not address the problems associated with long-range projectiles hitting the structure. Current research aims at solving this problem by a new strengthening technique using protective non-metallic geogrids applied on the existing concrete surface. Results of initial impact loading studies will be presented to demonstrate that non-metallic grid retrofits provide significant improvements in the impact resistance capacity of reinforced concrete slabs. In particular, slabs retrofitted with polyethylene grids show better performance compared to those retrofitted with other materials.