

بيانات عن بحث (6) مقدم للترقية

Flexural Behavior of RC Composite Beams with Ultrahigh Performance Fiber Reinforced Concrete Layer Using Finite Element Modeling

Engineers have investigated the use of various types of composite techniques on structural elements to obtain structural elements with high flexure capacity due to the need for higher strength structural materials and the need for large-span structures. The high compressive strength and deformation capacity of the Ultra-High-Performance Fiber Reinforced Concrete (UHPFRC) stimulated its utilization in the compression zone of composite beams to increase its flexural capacity. This study aimed to develop a three-dimensional finite element (FE) model using ANSYS software to scrutinize the flexural behavior of reinforced concrete composite beams with a UHPFRC layer in the top fiber zone and normal strength concrete (NSC) in the bottom zone subjected to flexural bending. The effect of the tensile reinforcement ratio and the thickness of the UHPFRC layer in the compression zone on the load capacity of composite beams has been investigated. The comparison of numerical analysis findings versus experimental data reported in the literature revealed that the results of the FE model were significantly close to the experimental results. It was noticed that the use of UHPFRC in the compressive zone of the composite beams had improved the flexural capacity of these beams. Additionally, the findings indicated that the optimal UHPFRC layer thickness was one-fifth of the beam height for beams with up to 3% tensile reinforcement and one-third of the beam height for beams with up to 5% tensile reinforcement.