NUMERICAL ASSESSMENT OF RC CONCRETE MEMBERS RETROFITTED WITH FRP FOR RESISTING BLAST LOADING

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The use of fiber reinforced polymers for the retrofit of existing structures is a common practice in blast protection. The tools used to assess the behavior of structures have become more refined allowing for precise modeling of reinforced members retrofitted with fiber reinforced polymers (FRP). However, many of these tools require extensive computational power that is often time consuming. This study aims to adapt an existing expedient dynamic analysis assessment tool in order to account for the behavior of reinforced concrete members retrofitted with FRP for flexural enhancement. FRP retrofits have been shown to increase the capacity of the members under severe loading conditions. However, the strength associated with the FRP layer is not always able to fully develop due to the debonding behavior between the two surfaces. The model will seek to capture this behavior by employing fracture mechanics along the bonded interface. The results of the modeling tool will be validated by comparing them to those of finite element analysis programs as well as available experimental test data. An additional parametric study will be conducted to evaluate the models ability to capture the bond behavior when adjusting the properties associated with the FRP.