DETERMINING THE EFFECTS OF CASED EXPLOSIVES ON THE RESPONSE OF RC COLUMNS

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The behavior of reinforced concrete (RC) components, particularly the residual capacity of RC columns, that are subjected to the effects of cased explosives involves a variety of complex physical phenomena. A description of the phenomena involved and the analysis methods needed to capture them is not well presented in the published literature. Determining the residual capacity of RC columns after subjecting them to the effects of cased explosives requires an analysis using high-fidelity physics-based simulation models. These models must be able to capture both the complex material behaviors involved and the effects of the fragment impacts, which impart both damage and loading to the column. Also highlighted are the basic uncertainties of the problem that have to do with the random nature of casing fragment creation and the extent to which this changes the basic character of the response from deterministic (e.g., as is the case for bare charges) to stochastic. In this paper, the basic physics of the problem as it pertains to the response of RC columns is examined along with a discussion of the complexities of performing finite element (FE) analyses for this class of problem. The probabilistic nature of the RC column's response is shown explicitly by examining a suite of response predictions.