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Design Procedures for Retrofitting Columns of Existing Reinforced Concrete Buildings Subjected to Blast Loads

A retrofit design procedure for the columns of reinforced concrete buildings has been developed as part of a US program to improve the capacity of existing buildings to survive terrorist attacks. To demonstrate the effectiveness of these procedures, a retrofit design was generated for a building being tested by the Defense Threat Reduction Agency at White Sands Missile Range, New Mexico. This full-scale structure represents a typical reinforced concrete office building that would be found on the East Coast of the United States. The building is being subjected to a series of explosive loads to measure its response to various threat levels. The retrofit techniques described use steel jacketing or composite wrap technology to enhance the ductility and strength of the building's columns. Steel and composite jackets have been used extensively for upgrading the seismic resistance of reinforced concrete columns in California. Since both jacket types are easily installed and cause little interference with the ongoing activities within a building, this approach seems uniquely appropriate for enhancing the blast resistance of existing reinforced concrete buildings.