

COLUMN BLAST ANALYSIS AND RETROFIT DESIGN

Joseph M. Magallanes¹, John E. Crawford¹, Simon Fu¹,
Doug Sunshine¹, Kenneth B. Morrill¹, L. Javier Malvar²

¹ Karagozian & Case, 2550 N. Hollywood Way, Suite 500, Burbank, CA, 91505; PH:
(818) 240-1919; FAX: (818) 240-4966; email: magallanes@kcse.com

² Naval Facilities Engineering Service Center, 1100 23rd Avenue, Port Hueneme, CA
94043; email: luis.malvar@navy.mil

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ABSTRACT

The Column Blast Analysis and Retrofit Design (CBARD) software is a tool for evaluating the blast response of reinforced concrete (RC) columns. It offers simple procedures for designing RC columns with blast resistance and also provides methods to retrofit existing RC columns to enhance their resistance to blast. The retrofit procedures are designed to prevent brittle failure modes commonly seen in columns subjected to blast effects, producing instead a ductile bending response with a much enhanced ductility. Two types of retrofit schemes are currently supported in CBARD: one scheme uses a fiber reinforced plastic (FRP) and the other uses a steel jacket. Columns having square, rectangular, and round cross sections are considered. The new Version 3.0 of CBARD offers enhanced methods for evaluating the effects from near-contact explosives, such as those imparted by person-borne and vehicle-borne improvised explosive devices (PBIED/VBIED) placed in close proximity to the column. The new version of CBARD also offers a means to consider the effect of non-uniform loadings on the column, which greatly facilitates the consideration of more realistic bomb scenarios. The most recent modifications to CBARD are described in this paper and are illustrated with several examples.