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Pierluigi Olmati , Dimitrios Vamvatsikos , Mark G. Stewart

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Safety factor for structural elements subjected to impulsive blast loads

Pierluigi Olmati[1a*], Dimitrios Vamvatsikos[2b], Mark G. Stewart[3c]

[1] Department of Architecture and Wind Engineering, Tokyo Polytechnic University, Japan.
[2] School of Civil Engineering, National Technical University of Athens, Greece.
[3] Centre for Infrastructure Performance and Reliability, The University of Newcastle, Australia.
[a] Researcher, fellow of the Japanese Society for the Promotion of Science JSPS.
[b] Assistant Professor.
[c] Professor and Director.
[*] Corresponding author; e-mail: olmati@t-kougei.ac.jp, pierluigi.olmati@gmail.com

Abstract

Design of blast loaded structures is usually carried out following a deterministic rather than a probabilistic approach. The design load scenario would cover the plausible load conditions (typically some conservative estimate) that a structure would experience if an explosion occurs but the probability that the structure will satisfy the design performances for the considered scenario remains unknown. Applying a performance-based design framework typically requires arduous Monte Carlo simulations, but a probabilistic design could also be achieved by a single structural analysis when consistent safety factors are applied to the load and the structural resistance. Such a factor is proposed herein for the case of components subjected to impulsive blast loads. The dependence of the safety factor on the amount of explosive, stand-off distance and their variability is estimated numerically