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Coupled Eulerian/Lagrangian Simulation for Overpressure Structural Response ANDREW LLOYD, HUA PAN, DAVID MILLER, JOHN COGAR — Accurately modeling blast dynamics is critical in the assessment of structures subjected to blast loading. The current industry standard for modeling blast effects in Lagrangian based Finite Element simulations is CONWEP; tabulated pressure data taken directly from blast events. CONWEP is limited, however, and may not always be physically representative of the blast/structural interaction that occurs in the field. Eulerian hydrocodes provide advantages over CONWEP in that they can capture shock front interaction and model blast surface interfaces with fidelity due to the presence of the working fluid. Eulerian codes, however, break down over larger time scales; whereas, Lagrangian modeling allows for discrete finite elements with definable boundary interfaces that can be tracked out to longer time scales. Hence, a hybrid approach that couples the Eulerian blast modeling with Lagrangian system dynamics is necessary. The objective of this paper is to demonstrate improvements in overpressure structural response modeling using a Coupled Eulerian/Lagrangian algorithm implemented in VelodyneTM. Velodyne results using the Coupled Eulerian/Lagrangian algorithm are compared to results from Eulerian hydrocode simulations and Velodyne simulations using the CONWEP algorithm.

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