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Measurements of Near-Field Blast Effects with Kinetic Plates VIRGINIA MANNER, Los Alamos National Laboratory, STEVEN PEMBERTON, None, GEOFFREY BROWN, Los Alamos National Laboratory, STEPHANIE NEUSCAMMAN, Lawrence Livermore National Laboratory, BRYCE TAPPAN, LARRY HILL, DANIEL PRESTON, Los Alamos National Laboratory, LEE GLAS-COE, Lawrence Livermore National Laboratory — Few tests have been designed to measure the near-field blast impulse of ideal and non-ideal explosives, mostly because of the inherent experimental difficulties due to thermal effects on gauges and non-transparent fireballs. In order to measure blast impulse in the near field, a new test has been developed by firing spherical charges at 15.2 cm from steel plates and probing acceleration using laser velocimetry. Tests measure the velocity imparted to the steel plate in the 50 - 300 microsecond timeframe, and are compared with free-field over-pressure measurements at 1.52 meters and millisecond timescales using piezoelectric pencil gauges. Specifically, tests have been performed with C4 to probe the contributions of ideal explosives and charge size effects. Non-ideal aluminized explosive formulations have been studied to explore the role of aluminum in near-field blast effects and far-field pressure, and are compared with formulations using LiF as an inert surrogate replacement for Al. The results are compared with other near-field blast tests and cylinder tests, and the validity of this test is explored with modeling and basic theory.

> Virginia Manner Los Alamos National Laboratory

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