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Impact Compaction of a Granular Material GREGG FENTON, Applied Research Associates, BLAINE ASAY, Spring Hill Energetics, LLC, STEVE TODD, Sandia National Laboratories, DENNIS GRADY, Applied Research Associates — The dynamic behavior of granular materials has importance to a variety of engineering applications. Although, the mechanical behavior of granular materials have been studied extensively for several decades, the dynamic behavior of these materials remains poorly understood. High-quality experimental data are needed to improve our general understanding of granular material compaction physics. This paper describes how an instrumented plunger impact system can be used to measure the compaction process for granular materials at high and controlled strain rates and subsequently used for computational modelling. The experimental technique relies on a gas-gun driven plunger system to generate a compaction wave through a volume of granular material. This volume of material has been redundantly instrumented along the bed length to track the progression of the compaction wave, and the piston displacement is measured with Photon Doppler Velocimetry (PDV). Using the gathered experimental data along with the initial material tap density, a granular material equation of state can be determined.

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