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Internal Blast II: Gas-Mixing Effect in Large Scale (62 cubic meter) Chamber[1] RICHARD GRANHOLM, HAROLD SANDUSKY, Indian Head Division, Naval Surface Warfare Center — The previous paper described how incomplete mixing of detonation product gases with the existing atmosphere could theoretically reduce internal blast quasi-static pressure by a factor of two, without considering fuel-air reactions (1). Extent of gas mixing was inferred in small-scale experiments by measuring pressure and temperature at two locations within a 3-liter chamber; unmixed product gases and atmosphere will be hot and cold, respectively. In this paper the study is extended to large scale, with 1 kg pentolite charges in a 62 cubic meter chamber. Fine-wire thermocouples are fast enough for the expanded time scale of events in the larger chamber, about 5 - 10 ms thermocouple response time compared to about 100 ms rise time to peak pressure, and showed significant unmixed regions of gas. Losses in peak quasi-static pressures of up to 11 percent can be attributed to this mixing effect for pentolite charges in the simple geometries tested. –footnote– (1) Granholm, R.H. and Sandusky, H.W., "Factors Affecting Internal Blast," Shock Compression of Condensed Matter, Proceedings of the 15th A.P.S. Topical Conference on, June 2007.

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