

Abstract Submitted
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A Novel Method of Resolving Ignition Threshold in Steven Test Using Hybrid Drop Weight-Hopkinson Bar VASANT JOSHI, Indian Head Division, Naval Surface Warfare Center — Sensitivity of energetic material is traditionally evaluated by a go-no-go ignition condition. In a conventional drop weight test, sand paper is used to pin the sample in place. In Steven test the base metal directly acts on solid explosive. Although comparison of different explosives using blast overpressure in Susan or Steven test as a function of projectile impact velocity may be valid for a range of velocity, these tests, aimed at obtaining ignition have unintentional changes in friction conditions, which may contribute to initiation. There has been little effort to evaluate the effect of frictional contribution. Individual contribution of shear, strain, strain rate and friction in attaining ignition cannot be separated in any of these tests. We propose to quantify shear by lubricating the samples in an instrumented Hybrid Hopkinson bar, wherein the combination of shear and strain rate leading to ignition condition can be assessed. The current configuration of Hybrid Hopkinson Bar apparatus is being modified to conduct a subscale Steven test to evaluate the contribution of frictional changes leading to ignition. This will allow a number of tests to be conducted in lab scale, instead of expensive full scale tests. Use of real time diagnostic techniques in combination with data acquisition and reduction methods to simultaneously quantify mechanical properties and ignition conditions will be presented.

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