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Effect of Shape Resolution on the Simulated Energetic Response of Shock Induced Pore Collapse within HMX. JESUS MARES JR., D BARRETT HARDIN, G "CHIP" BUTLER, AFRL, JAMES VITARELLI, University of Dayton Research Institute, CHRISTOPHER MOLEK, AFRL — It is widely accepted that the shock initiation of explosive materials is largely dependent upon the localization of energy at material defects commonly referred to as "hot-spots". Many studies have investigated the effect of size and distribution of the shock-induced collapse of voids within explosive materials. However, there is limited understanding of the effect of void shape on the collapse process and subsequent energy localization. In this work, we utilize complex Fourier descriptors to characterize a series of 2-dimensional void structures imaged via scanning electron microscopy of pressed HMX material. The shape information of the void structures is then modified by a series of increasing low-pass filters to yield increasingly "smoothed" void structures. The shock induced collapse of these modified void structures is then simulated to investigate the effect of the resolution of shape detail on the resulting energy localization of the collapse process. This work intends to evaluate the level of spatial resolution needed to "adequately" characterize the void structure of a specified size under various shock loadings. DISTRIBUTION A. Approved for public release: distribution unlimited. (96TW-2019-0047).

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