

Abstract Submitted  
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**Engineered Defects in Single Crystal HMX<sup>1</sup>** CHRISTIAN SORENSEN, CAMILO DUARTE, STEVEN SON, Purdue University — Phase contrast and optical high-speed imaging were applied to simplified explosives systems with a single, near-perfect HMX crystal with an(a) engineered defect(s). Five and ten MHz frame rates recorded impact experiments on engineered defects which include single voids, multiple voids in various configurations, and slots designed to create a stress concentration and nucleate shear crack networks. Data from these experiments will be presented along with simulations ranging in scale from molecular dynamics to mesoscale models with single crystal HMX or single crystal/polymer systems. Slip/cleavage plane data from models will be compared to observed crack networks in loaded single crystal HMX with engineered defects. Implications for hotspot locations will be discussed.

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