Abstract Submitted
for the SHOCK11 Meeting of
The American Physical Society

Modeling Detonation in Ultrafine TATB Hemispherical Boosters Using CREST NICHOLAS WHITWORTH, AWE Aldermaston — Hemispherical ultrafine TATB boosters are often used to initiate detonation in the TATB-based explosive LX-17. For accurate hydrocode predictions of experiments using this combination of explosives, it is important to accurately model the detonation wave emerging from the booster material since this may influence the detonation behaviour in the main charge. Since ultrafine TATB exhibits non-ideal detonation behaviour, it's response should be modeled using reactive flow. In this paper, the CREST reactive burn model, which uses entropy- dependent reaction rates to simulate explosive behaviour, is applied to experimental data obtained from ultrafine TATB hemispherical boosters initiated by slapper detonators at three initial temperatures (ambient, -20 degC and -54 degC). The ambient temperature data is used to develop an initial CREST model for ultrafine TATB which is then subsequently applied to the cold data. A comparison of the experimental and modeling results is presented showing that the model gives good agreement to experiment at both ambient and cold temperatures.

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Date submitted: 11 Feb 2011 Electronic form version 1.4