

Abstract Submitted
for the SHOCK13 Meeting of
The American Physical Society

Strength and Sintering Effects at Ejection of Explosively Driven Sand A.D. RESNYANSKY, S.A. WECKERT, Weapons Systems Division, DSTO, Edinburgh SA 5111, Australia — A description of sand response to extreme loads is very important for the evaluation of the sand ejecta effects to civilian and military targets. Sand is a complex material to simulate because of its porosity. With porous materials it is very hard to achieve the inter-phase equilibrium in shock waves. A previously developed two-phase model with strength has been implemented in CTH and applied to quartz sand. It has been shown that the Hugoniot abnormality known from the literature for highly porous silica is adequately described with the material non-equilibrium approach. Several models available in CTH may describe the flash X-ray observations available in the literature for the sand ejecta due to explosion of buried charges. However, a test-calculation divergence is noticeable when considering different burial depths. This is attributed to the material property variations due to the thermal sintering effects of the sand particles. Dynamic flash X-ray observations of aluminium plates loaded by ejected sand have been conducted, which has confirmed the material property variations in the ejected material. CTH calculations with a sintering kinetic implemented in the two-phase model improve description of the present tests and the sand ejecta tests at different burial depths.

Anatoly Resnyansky
Defence Science and Technology Organisation

Date submitted: 20 Feb 2013

Electronic form version 1.4