Abstract Submitted
for the SHOCK19 Meeting of
The American Physical Society

Experiments and modelling of explosive loading of several sands
S.A. WECKERT, A.D. RESNYANSKY, WCSD, Defence Science and Technology Group, PO Box 1500, Edinburgh SA 5111, Australia — The present work suggests an experimental set-up for analysing the shock transfer through porous materials such as sand. Within this set-up, the corresponding experiments observe the shock wave transmission through a porous material using flash X-ray images of the deformation of a circular thin metallic plate, where the plate is impacted by the material ejecta due to the loading by a buried high explosive charge. The materials analysed include calcite and several quartz-based sands. The loading is performed by two different charge configurations representing a variability in the loading input. The images demonstrate a good sensitivity of the suggested test set-up to the material variations, which enables one to employ the corresponding test results for model validation. The observations are used in the present work for validation of a two-phase material model implemented in the CTH hydrocode with constitutive equations obtained earlier with the Split Hopkinson Pressure Bar and shock consolidation tests. The CTH modelling employing the two-phase model demonstrates that the model is suitable for describing the test results.

Anatoly Resnyansky
Defence Science and Technology Group

Date submitted: 02 Mar 2019 Electronic form version 1.4