Abstract Submitted
for the SHOCK15 Meeting of
The American Physical Society

On the high-rate failure of designed architectures of CFC materials CLARA FRIAS, UMARI, School of Materials, University of Manchester, Oxford Road, Manchester M13 9PL,, S.A. MACDONALD, MXIF, School of Materials, University of Manchester, Oxford Road, Manchester M13 9PL,, D. TOWNSEND, N.K. BOURNE, CMEC, The University of Manchester, Research Complex at Harwell Rutherford Appleton Laboratory, Didcot, Oxfordshire, OX11 0FA, United Kingdom., C. SOUTIS, UMARI, School of Materials, University of Manchester, Oxford Road, Manchester M13 9PL,, P.J. WITHERS, MXIF, School of Materials, University of Manchester, Oxford Road, Manchester M13 9PL,, UOM COLLABORATION
— The Taylor test is an important means to determine the response of materials to dynamic loading. In this work it is used to determine the integrated response of c-fibre materials to dynamic loading. The hierarchy of damage across the scales is key in determining the suite of operating mechanisms and such information cannot be correlated using traditional sectioning and observation using optical or electron beam microscopy. Experiments record a series of engineered composite plies with high-speed photography. Our study images at the micron length scale with in-line phase contrast but also fast and high spatial resolution methods. Quantitative volume and void morphology developed at various axial distances from the impact face indicate planes of deformation that track back to initiation. This hierarchy of damage across the scales will be key in determining the suite of operating mechanisms; such information cannot be correlated using traditional sectioning and observation using optical or electron beam microscopy.

Neil Bourne
University of Manchester

Date submitted: 01 Feb 2015 Electronic form version 1.4