

Abstract Submitted
for the MAR12 Meeting of
The American Physical Society

Akrology; the physics of the extreme behaviour of metals and energetics NEIL BOURNE, AWE — Structures designed for extreme environments must be designed not only for the magnitude of the load that they will experience, but also the time for which that load acts upon them. At the core of the problem lies the loading impulse experienced by materials and the operating deformation mechanisms that are excited. Our experience of materials' physics, gathered by investigating response to mechanical loads, has suggested a series of descriptive constructs within which we build our picture of behaviour. At the highest loadings and the shortest loading times this perception is coloured by experience gathered from historical considerations. This paper suggests a framework by which to interpret data collected on the response of metals and explosives. It suggests that strength is a quantity that decays over time and that fundamentally approaches zero in the limit of infinite time. Controlling this decay is the business of engineering to design structures that will survive in the environments our times of interest define.

Neil Bourne
AWE

Date submitted: 11 Nov 2011

Electronic form version 1.4