

Abstract Submitted
for the SHOCK17 Meeting of
The American Physical Society

Assessing the Effect of the Role of Detonation Wave Curvature on the Firing Times of High Voltage Detonators ROD DRAKE, AWE Plc, EXPLOSIVE MATERIALS & INITIATION SCIENCE GROUP TEAM — In detonators the lost time is the difference between the measured and calculated time for the reactive wave to transit the explosive charge. The calculated time is derived from the charge thickness and the steady state detonation velocity. For both EBW and EFI detonators the lost time is significant and, for detonators of comparable dimensions, greater in EBW detonators. Typically, the lost time is attributed to a finite growth to detonation time. The bridgewires and foil flyers of EBW and EFI detonators respectively establish reaction fronts over very small areas in the explosive. Even with a significant run to detonation distance, the detonation front may be expected to be highly curved and, thus, have a detonation velocity below the steady state velocity. Consequently, the time and distance required for a steady state detonation velocity to be established may also contribute to the lost time in EBW and EFI detonators. To assess the relevance of wave curvature on lost time a simple analytical model has been developed which takes into account growth to detonation and detonation wave curvature effects. The model showed that detonation wave curvature could be responsible for at least some of the lost time of EBW detonators. British Crown Owned Copyright 2017/AWE

Rod Drake
AWE Plc

Date submitted: 10 Apr 2017

Electronic form version 1.4