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The Response and Mechanism of Response of PETN Chip Slapper Detonators to Electrical, Thermal and Mechanical Threats ELIZABETH LEE, AWE Plc, EXPLOSIVE MATERIALS & INITIATION SCIENCE GROUP TEAM — The successful design of electro-explosive devices requires their safety characteristics as well as performance to be considered. In order to design components that pass the necessary safety tests an understanding is required of the way in which the various threats interact with the device and in particular the explosive fill(s). A prototype PETN chip slapper detonator has been subjected to a suite of electrical, thermal and mechanical threats. Insulted detonators have subsequently been examined using X-ray CT to assess the damage to the explosive fill. Using fundamental understanding of the initiation of PETN compacts and chip design an attempt has been made to understand the conditions at which reaction occurs, the parameters which may dictate the violence of such a reaction and the mechanism by which reaction occurs in order to design detonators which contain the necessary mitigating features. A comparison to a semi-analytical model has been made.

Elizabeth Lee
AWE Plc

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