

## **DEVELOPMENT OF A REFERENCE AID FOR RENDER SAFE PROCEDURES OF IMPROVISED EXPLOSIVE THREATS**

M. Ceh<sup>1</sup>, T. Josey<sup>1</sup>, P. Desgagnés<sup>1</sup>, L. Donahue<sup>2</sup>

<sup>1</sup> *Defence Research & Development Canada, Suffield Research Centre, PO Box 4000, Stn Main, Medicine Hat, Alberta, T1A 8K6, Canada;* <sup>2</sup> *Lloyd's Register Applied Technology Group Halifax, NS, B3J 3J8, Canada*

**Key words:** Improvised Explosive – Homemade Explosive – Render Safe Procedures – Numerical Modelling

Improvised explosive devices (IEDs) are a prevalent threat against armed forces and public security organizations. Improvised explosives are often the energetic component of IEDs due to readily-available materials and information on their manufacture. These explosives are inherently unpredictable due to their improvised nature and can be sensitive to thermal and physical insult. These traits create a challenge to security forces who must deal with the neutralization and disposal of these threats. Information on the characteristics of these explosives and guidance on their treatment in render safe procedures (RSPs) would improve the probability of successful action against these threats.

A series of experimental trials was conducted at Defence Research & Development Canada – Suffield Research Centre to gather data on the reaction of various RSP tools (i.e., water jet disruptors) against improvised explosives. Trials involved a disruptor fired into container of a known explosive mixture at a given stand-off distance. The explosive charge was placed on a steel witness plate. Several combinations of disruptors and improvised explosives were studied. High-speed video (HSV) was used to capture the reaction of the explosive mixtures, while an array of pressure transducers was used to capture overpressure from any explosive reaction. The reactions observed ranged from no reaction to full detonation. Data from the experimental trials were augmented with numerical models of high velocity water jets and a reaction model of a sample improvised explosive.

The information from the study was collated and organized to develop a reference aid with a simple user interface that provides the users of RSPs with guidance on the selection of the appropriate tool for a given threat.