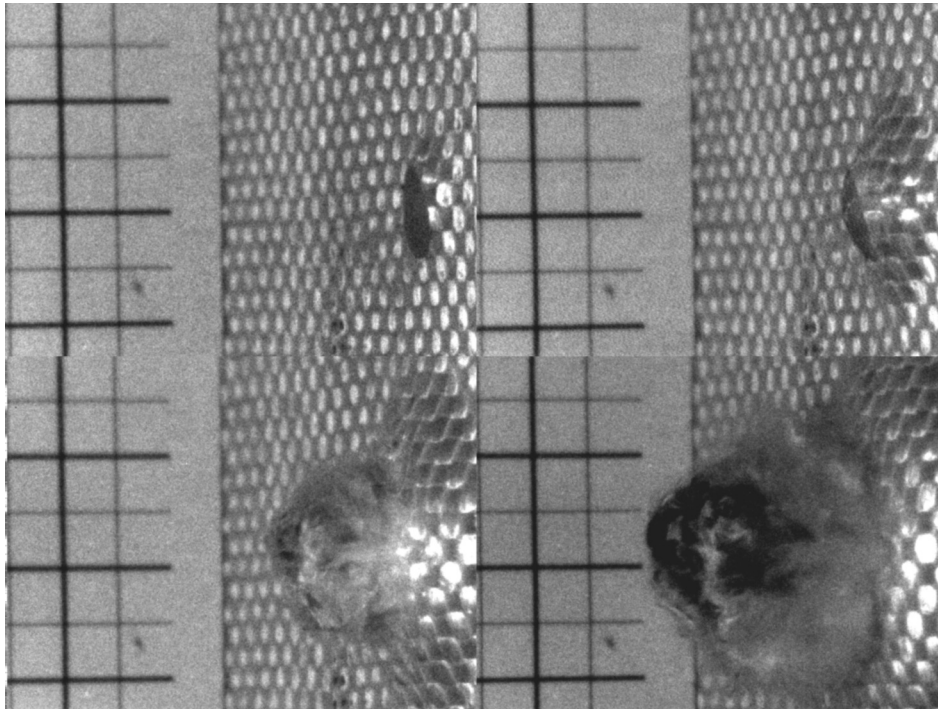




Specialised Imaging

Application Note 3

Ultra-high speed recording of an armour piercing round exiting kevlar material



IMAGING PARAMETERS

The SIM4 Framing Camera with a 80-200 mm Zoom lens running at 200 mm, with a 1 metre standoff distance giving us a 75 mm horizontal field of view. Trigger synchronization was accomplished using an optical sky screen 300 mm up range of the target. This time of arrival gave us adequate time to turn on the 1 msec duration flash lamp used for lighting.

EQUIPMENT PARAMETERS

The SIM4 was programmed to take a 4 frame sequence with initial delay of 460 usec to equal time of arrival of the 50 Cal bullet to the surface of the Kevlar target. The interframe times of 22 usec and 100 nsec were set to capture the exit of the round with no motion blur. The 1 msec flash was trigger 100 use prior to frame 1 to ensure full brightness at the time of recording.

OVERVIEW OF EXPERIMENT

The Kevlar material under test was posing in the holder. A grid was placed behind the material so that late velocity and motion data could be measured. The 50 Calibre projectile was fired from a fixed mount gun. The optical sky screen was positioned 300 mm up range of the target to allow for the projectile to trigger the sky screen and give us a trigger ahead of the arrival at the target material. This time of arrival gave adequate time for the flash lamp to come to full brightness prior to the images being captured. The material was stuck by the 50 Calibre projectile travelling at about 900 m/sec. The high resolution images show the distortion of the material prior to the failure and eventual exit of the projectile.