

APPLICATION NOTE 14

Detonation of High Explosive Driven Liner

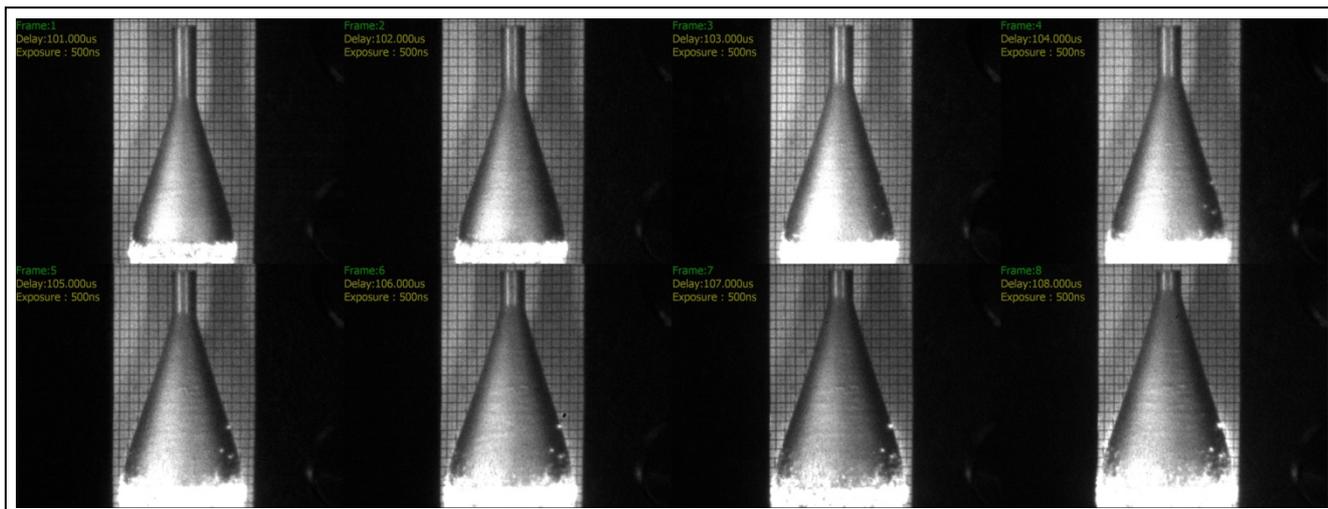


Image Courtesy of Hyperspectral Sciences, Inc. Cinebar, WA

IMAGING PARAMETERS

For this experiment a SIM8 Ultra Fast Camera running at 1 million fps (1360 x 1040 pixels per frame) with 500 ns exposures and front lighting was used.

EQUIPMENT PARAMETERS

A bank of four 1 msec duration 45 Joule xenon flash lamps was directed at the subject in close proximity. A folded optical path around a blast shield using a front surface mirror was used to protect the SIM8 Framing Camera from the blast debris and over pressure. A Nikon 180 mm f2.8 lens with tele-converter doubler, set at f8 for improved depth of field, was used with a total working distance of approximately 30 feet. The flash lamps were synchronized using the SIM8 camera's internal flash output drive pulse and triggered 100 usec prior to the first frame to ensure full brightness. The camera was programmed via internal delay generators to generate a sequence of frames at 1 usec intervals with 500 ns exposures to cover the 7.5 usec recording period of interest. Due to the high sensitivity of the SIM8 camera - internal gain was set very low to optimise image quality. Within seconds of the detonation the image sequence was downloaded to the control laptop computer via an Ethernet link and the images were saved to hard drive for post image and data processing.

OVERVIEW OF EXPERIMENT

High Explosive (HE) driven liner was detonated using standard exploding bridgewire detonators (EBW). Initial timing for the detonator and camera was generated using timing from digital delay generators. Additional synchronization of precise delays to start of frames and flashes were achieved using internal camera timing generators with nanosecond accuracy.