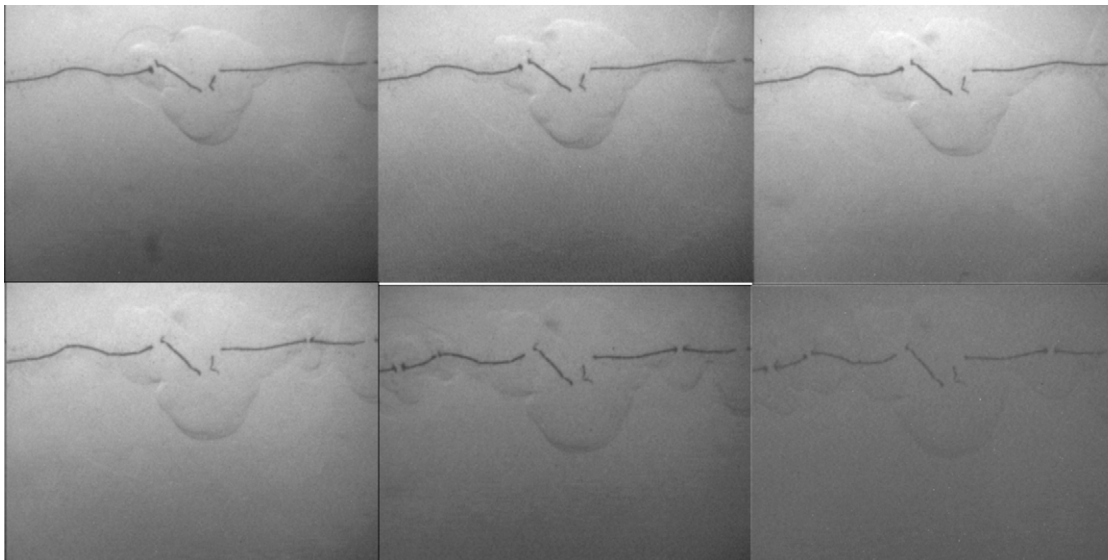


No. 11

Ultra-high speed pseudo-Schlieren imaging of a back-lit Bridge wire



IMAGING PARAMETERS

A 105mm lens with a 100mm extension tube was used with the SIM6 framing camera to give a 6cm field of view. The camera standoff distance was 10cm. A trigger signal was obtained by using a few turns of wire around the HT lead that was connected to the break wire. The delay in the wire breaking (about 10 μ s) gave us adequate time to turn on the 20 μ s duration flash lamp used for lighting.

EQUIPMENT PARAMETERS

The SIM6 was programmed to take a 6 frame sequence with initial delay of 20 μ s to allow the flash to ramp up to full brightness and also for the break wire to have broken, The exposure was 5ns and the interframe time was 2 μ s. The IF300 flash was triggered 8 μ s prior to frame 1 to ensure full brightness at the time of recording.

OVERVIEW OF EXPERIMENT

The break wire is a bright self luminous event, and the plasma that is produced conceals the actual process of the wire breaking. The IF300 (300J) flash was used to overcome the self luminosity of the event. The flash, which is a spark source, was used in back lit mode and a concave mirror was placed at 45 degrees between the event and the flash lamp, thereby, creating a pseudo schlieren system. The benefit of such a setup allowed us to see the breakup in the wire but also visualise the shock waves generated.

The fracture of the break wire was caused by 2.5KV being applied to the wire. The intensity of the plasma emitted by the breakdown process was itself saturated by the flash lamp energy thus allowing the camera to see the mechanics of the actual breakdown.

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