High Strain Rate Hopkinson Bar Analysis

Trilion has installed a high speed ARAMIS system on the split Hopkinson Bar at the University of Michigan-Dearborn, where Dr. German Reyes, Prof. Alan Argento and their graduate students are studying various engineering materials in compression and in tension. The specially developed sensor using Photron APX RS cameras running at approximately 100,000 frames per second was easy to align and robust in vertical and overhead configurations. 6 and 3 mm thick specimens were viewed along their entire length, and the effects of cracking were observed.

The camera bar was completely stable over several days in the vertical orientation, which is required to view the ends of a short specimen sandwiched between larger diameter bars.
3 mm thick specimen which cracked during testing.

An area of high local compression was observed at the incident bar end.
The axial displacement section line plot confirms the presence of a gradient at the incident bar end.

The blue and black lines show a decrease in strain as a result of the crack formation. It is believed that the discontinuities in the strain rise on the red and purple readout points are indicators of internal damage occurring.
The sensor in a top-down configuration for use on a different loading mechanism.