

HIGH SPEED 3D DIGITAL IMAGE CORRELATION FOR DEFORMATION MEASUREMENT OF PLATES UNDER EXPLOSIVE LOADING

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Measuring the dynamic response of structures due to blast loading is complex because of the high strain rates, the transient nature of the deformation and the interactions between the blast wave and the structure. Several studies have investigated dynamic deformations due to explosive blast loading on plates using strain gauges, accelerometers or velocity meters, which only provide point wise information. This study describes the optimization of a high-speed stereo-vision system combined with 3D digital image correlation used as a non-contact measurement system to obtain full-field deformation data of thin plates subjected to blast loading. The accuracy and performance of this measurement system is evaluated by (i) the study of the effects of the shutter time, frame rate, image intensity and speckle pattern on the accuracy of the displacement measurements and by (ii) the comparison of the measured displacements by 3D high-speed DIC with those obtained using a laser distance meter.