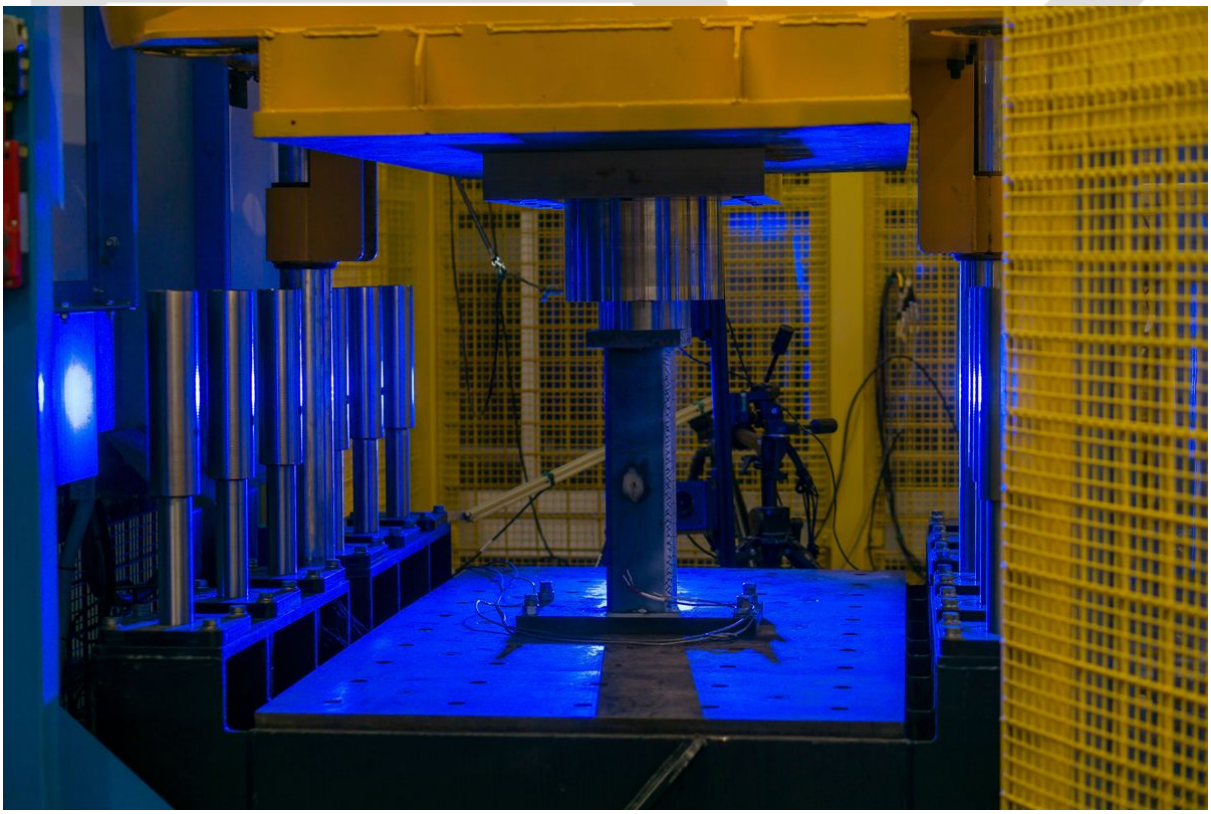
Customer Success Story

Dec 2020

Monash University, Department of Civil Engineering

Product: ARAMIS High-Speed, GOM Correlate Professional

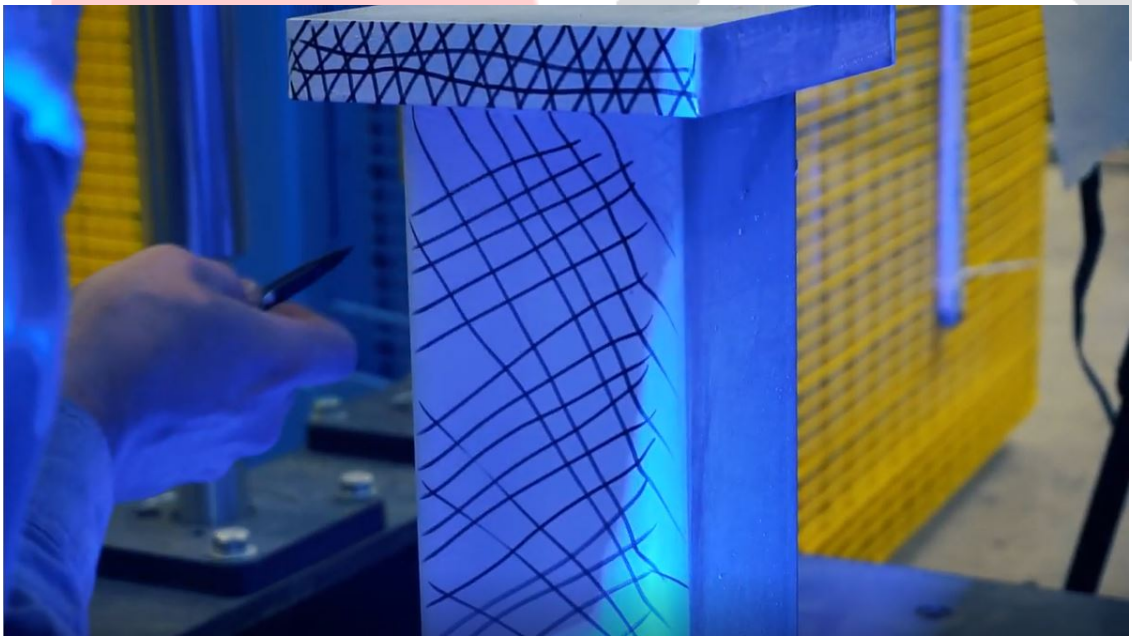
Understanding how materials and structures respond to impact forces is critical when designing, engineering, and manufacturing components and assemblies that will experience impact. The National Drop Weight Impact Testing Facility (NDWITF) at Monash University is a unique, state of the art facility, that aims to resolve some of these uncertainties by observing and measuring the behaviour of elements under high impact.



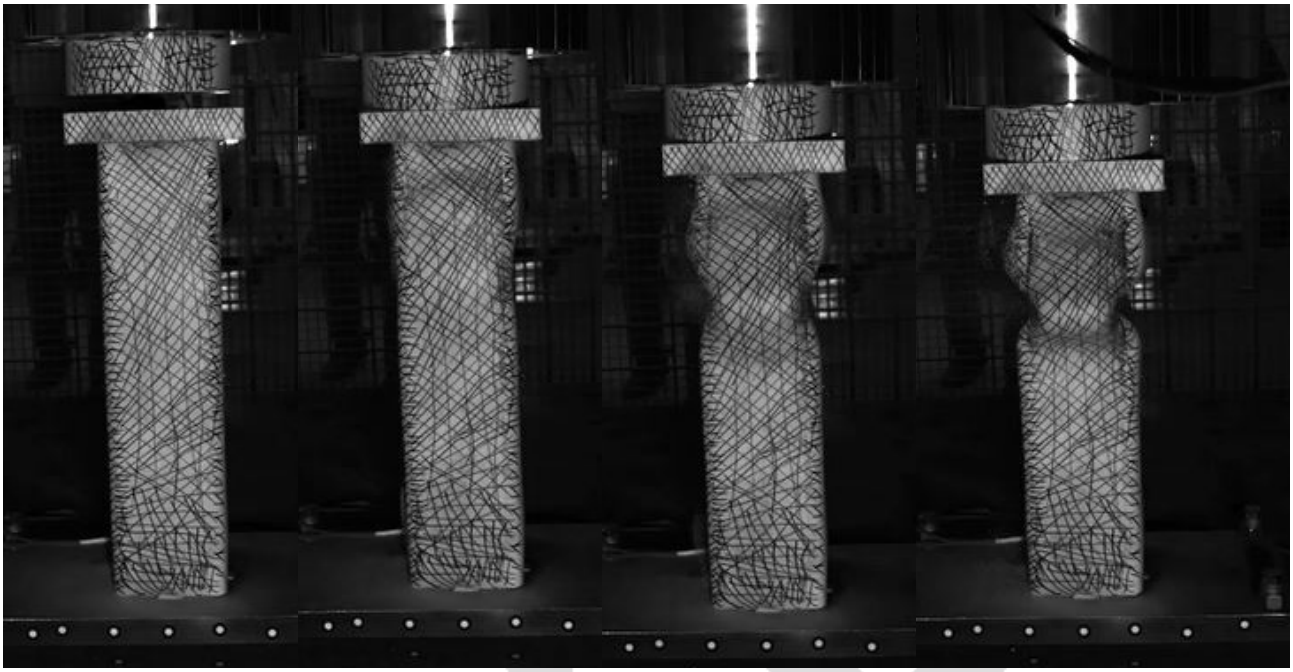
The facility which was funded by the Australian Research Council and 7 major universities, is the largest of its kind in Australia and features a hammer which is guided by two long columns onto the specimen. The hammer can be loaded with weights up to 2000kgs. Specimens can be as large as 1m in width and 2m in length. The hammer can impact the specimen at a velocity of up to 18m/s and can achieve impact energy of up to 200,000 J.

Scan-Xpress supplied Monash University with a High-Speed ARAMIS System from GOM Metrology of Germany that can quantitatively measure deformation and displacement on the specimen during impact.

The ARAMIS system uses two high-speed Photron Cameras that can record images at a minimum of 6,400fps. A speckle or stochastic pattern is applied to the surface of the specimen and this allows the computation of 3D coordinates. The images are recorded as the specimen experiences impact and the images are then loaded into the software GOM Correlate Professional for analysis.

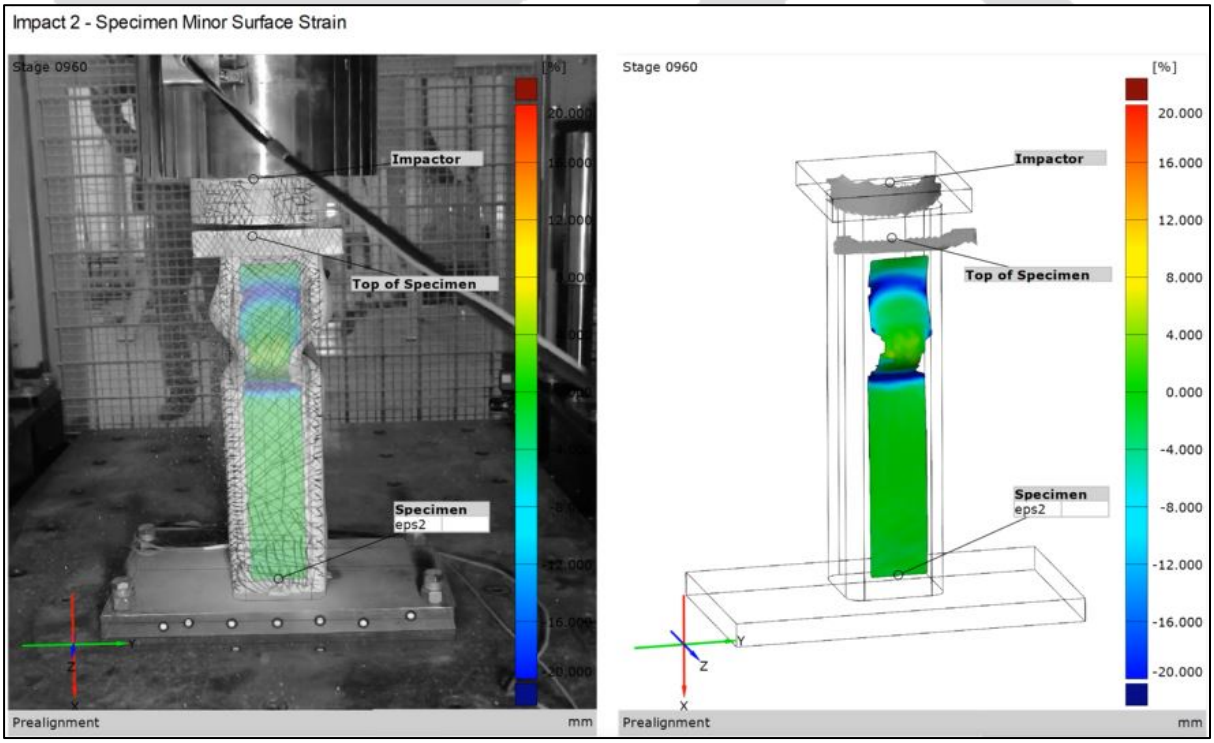


The industry leading Digital Image Correlation (DIC) software, GOM Correlate, can compute 3D coordinates, 3D displacements, velocities, accelerations, strains, and measurements of 6 degrees of freedom (6DoF) for static or dynamically loaded specimens and components.

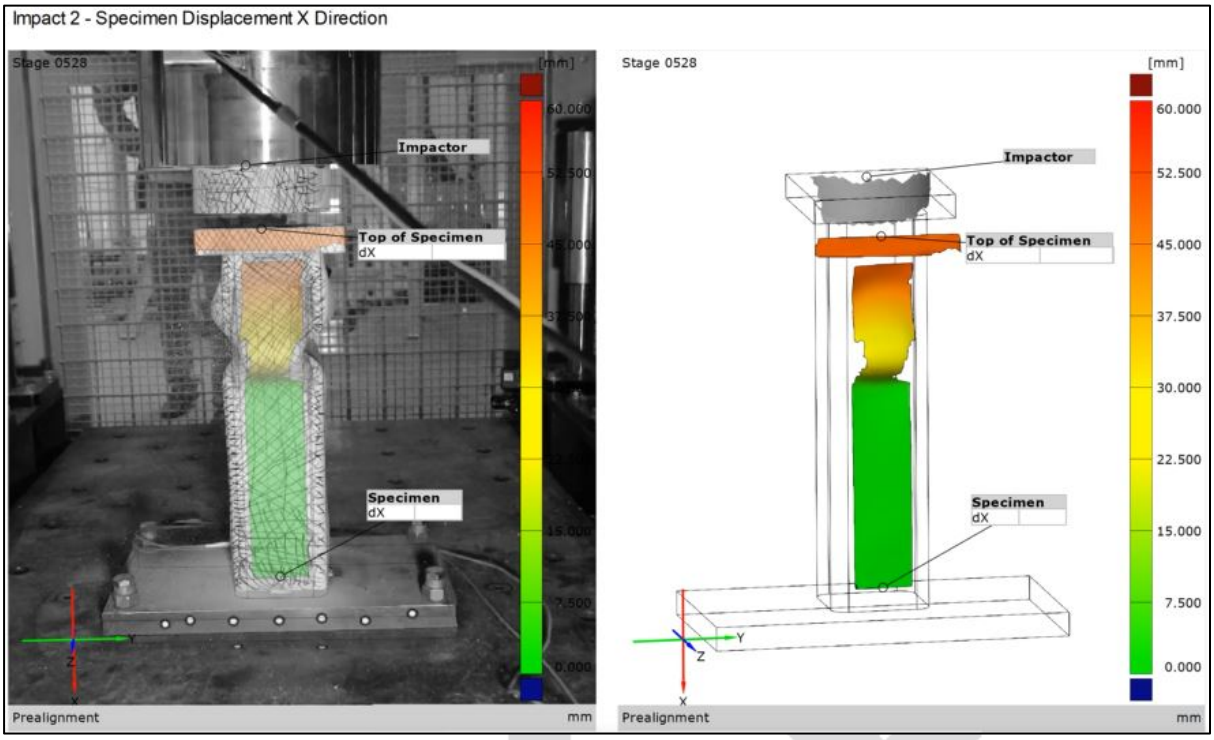


After samples have been tested and deformed, impact parameters such as displacement and strain can be calculated and measured, and their results displayed quickly and accurately.

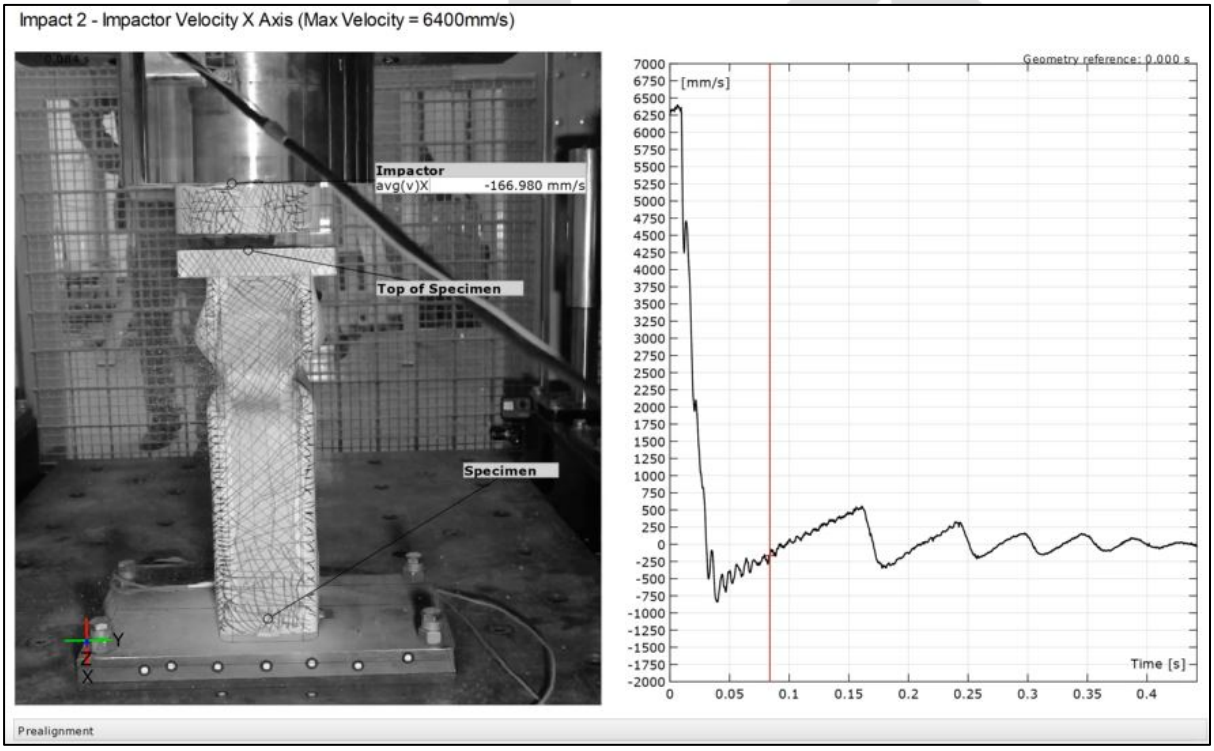
The images below show how the strain and displacement can be calculated using the stochastic deforming surface pattern.



The wireframe in the right-hand images is a representative CAD model of the specimen. Importing the CAD model into the software and aligning the measured data to it, means the results can be realized in a predefined co-ordinate system.



Not only can the strain and displacement on the specimen be determined but the software can also determine the velocity of the impactor before and after impact.



Monash University chose an ARAMIS DIC system because of its high accuracy and high resolution, the ease of use of the software and reporting functions including the ability to import FEA models and compare them to measured data, parametric inspection and analysis, customisable time ranges, customisable project templates for automatic data processing, and an ability for user defined mathematics and analysis.

Scan-Xpress is grateful to have been apart of such an exciting project and is excited to continue assisting researchers and universities with high-quality optical deformation systems and software.