

Problem overview

ODS (Operating Deflection Shapes) during high velocity impact testing of a hockey stick are investigated. The ODS analysis allowed for modal frequency discernment as well as fatigue point detection. ARAMIS high-speed vibrational analysis methods were employed for the investigation.

Test setup

ARAMIS AX 3D System, using a pair of Photron AX-200 high speed cameras sampling at 10kHz and high intensity lights, measure the operational deflection modes during the impacting experiment. The ARAMIS dot target tracking capability is used to measure the stick flexion. Figure 2 shows a hammer impact to simulate the frequency response function sustained during a slapshot.

Notes

The ODS application showed that ARAMIS optical metrology has advanced capability for evaluating the operational deflectional shapes sustained during high velocity impact testing of hockey stick. The stick was impacted by means of a slapshot in which target dots on the stick were inspected for 6 DOF deflection and rotation.

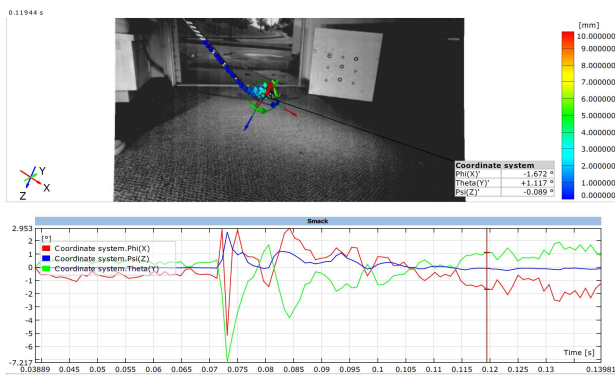


Figure 1

The rotations of the constellation of points affixed to the hockey stick are shown above illustrating the flexion sustained during a slapshot.

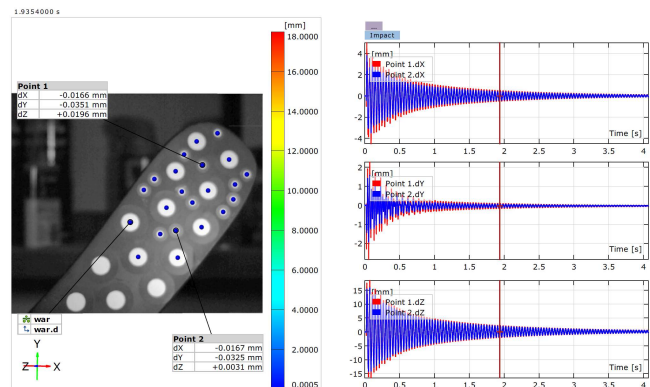


Figure 2

Conclusion

Optical metrology solution, such as the ARAMIS digital image correlation technology, was able to accurately measure frequency response function as well as deformation sustained during normal use. These results can be further use to perform vibration analysis and tune the stick which would improve it's accuracy.

For more information on this application, please contact Trilion Quality Systems, world leader in custom optical metrology application development at 215-710-3000.

Keywords: *Operating deflection shapes, frequency response function, ARAMIS, Deformation*