APPLICATION NOTE
AN1712

TRILION - APPLICATION NOTE
Measuring Tire Shape with Projected Stochastic Pattern

trilion

Problem overview

Measuring shape deformation of a tire tread and sidewall at speed has long been the endgame for all OEMs. Traditional measurement methods have been limited to FEA models, which cannot accurately predict deformation in real world conditions. ARAMIS high definition optical metrology techniques were applied to deliver the first ever real world shape deformation method of tire tread and sidewall under load.

Test setup

Notes

ARAMIS high definition optical metrology was used to highlight the ability of the system to quickly produce a shape profile of a tire sidewall under various loading conditions. The test specimen was submitted to varying degrees of slip, camber, load and speed using a simulated rolling road machine. On Figure 1 the result of a combined 2 degree camber and slip position at 75 mph. are presented.

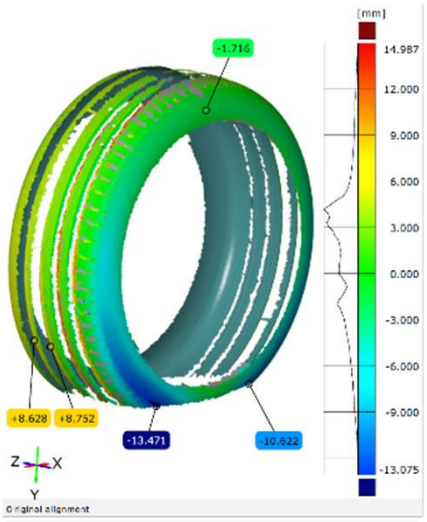

Figure 1

The unique application of this method allowed for a tread separation and sidewall bulge measurement in addition to a shape retention comparison. These results validated the FEA model as well as elucidated invariances not predicted by the model.

Conclusion

ARAMIS digital image correlation technology was proven to be effective for measuring the shape change of a complete tire under various loading conditions. By using our revolutionary high definition optical metrology solution, ARAMIS was able to efficiently and accurately measure shape deformation in a highly dynamic environment.

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

Keywords: *Tire, Automotive, ARAMIS, DIC, Deformation,*