

# **Scaling the operating deflection shapes obtained from scanning laser doppler vibrometer**

## **Abstract**

Operating Deflection Shapes (ODS) has emerged as one of the powerful techniques in vibration analysis to understand and to evaluate the absolute dynamic behaviour of a machine, component or an entire structure. Traditionally, accelerometers have been used to get the ODS of a structure. However, recent development shows that certain situation may not allow direct contact with the structure under investigation. Therefore, Scanning Laser Doppler Vibrometer (SLDV) has become popular in the investigation. In this paper, a new ODS Frequency Response Function (ODS FRF) for investigations using SLDV is formulated. The ODS FRF is used to construct the ODS of the structure. A new form of scale factor for the ODS FRF is also introduced to normalize the effects from variable excitation force. The importance of this scale factor is demonstrated on a beam and plate under the excitation of varying forces. It is found that the suggested ODS FRF and the scale factor give the desired result in comparison with theory. © 2011 Springer Science+Business Media, LLC.