

Digitalisation in Quality Management

Software-Supported Residual Stress Determination

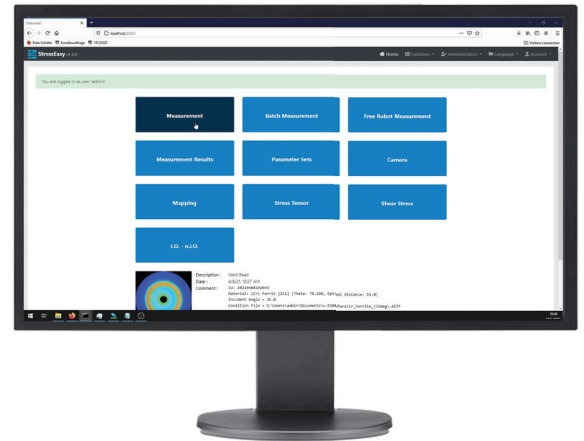


Advanced manufacturing processes often require fast and automated determination of residual stress conditions beyond a simple individual measurement. In complex stress conditions several measurements must be combined into one final result. On critical surfaces, so-called residual stress mappings must be performed in order to be able to evaluate the overall stress state. In laboratory measurements, batch processing of measurement tasks is preferred, being processed unattended if possible. In production lines an automated target value check is required.

sentenso Smart Peening Solutions now presents StressEasy, an advanced software solution for the extremely fast X-ray stress analyser μ -X360s. With StressEasy the above-mentioned multiple measurement tasks for the advanced determination of residual stress states can be easily setup, programmed and automated in a user-friendly way by means of a six-axis robot.

StressEasy – Residual stress determination in Industry 4.0

The field-proven software extension for the μ -X360s X-ray stress analyser opens up far-reaching options of measurement automation for the user. While the standard software only controls individual measurements and manages results, StressEasy can do much more. The software enables the configuration and combination of individual measurements into an overall picture. In combination with the mobile, fast and compact X-ray stress analyser StressEasy develops its full potential when used with a six-axis robot for automated movement of the sensor unit from spot to spot.

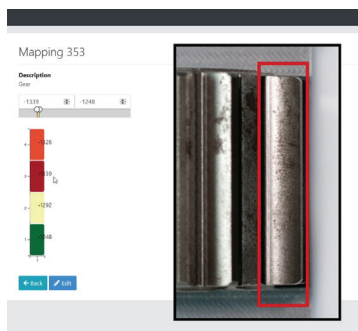


Automation of the following measurement tasks:

- Complete stress tensor
- Out-of-plane stress states
- Residual stress mappings
- Batch measurements
- In Range / out of Range measurements
- Oscillation (linear, circular, psi angle)

Exemplary Setups

Residual Stress Mapping



Batch measurement to determine the complete stress tensor



Stress Tensor Calculation 129

Residual Stress σ_x	-731.5
Residual Stress σ_y	-701.5
Residual Stress τ_{yz}	23.80705629913013
Residual Stress τ_{zx}	-14.704358302403904
Residual Stress τ_{xy}	5
Measurement Result σ ($\varphi = 0^\circ$)	Wälzlagering

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