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Structured Blue Light Non-Contact Optical Metrology Gage R&R Measurement Study on Aerospace Airfoils

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STRUCTURED BLUE LIGHT NON-CONTACT OPTICAL METROLOGY GAGE R&R MEASUREMENT STUDY ON AERSOSPACE AIRFOILS

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This Gage R&R study of turbine blade airfoils was performed by a leading aerospace manufacturing company.

- Part-to-part variation (product)
- Repeatability (measuring equipment)
- Reproducibility (operators)

The Gage R&R result quantifies the measuring system and the process to ensure it is acceptable for the specified task. Gage R&R studies are conducted for capital equipment requisition as well as internal and external projects and/or buy-offs to ensure process integrity and quality control. An ATOS structured blue light 3D digitizer, MCXL automation, and a reference frame were used in this measurement study.

Test Parameters

- 3 operators
- 10 turbine blade airfoil castings
- 3 runs

15 critical industry standard measurement points were selected for the analysis.

In order for a measurement system to be acceptable, the % Tolerance must be less than 10%. Due to the intricate organic shape of turbine blades the AA TWIST, BB TWIST, and CC TWIST are areas where it is expected to receive the highest numbers. These measurements are on the sharpest areas of the airfoil on the leading and trailing edges. Measurement systems can have a difficult time capturing data and calculating the blade's end point.

This study will cover statistical data and mathematical calculations with in-depth explanation of process and results.