

# USED OF AUTOMATED SOFTWARE TOOL FOR ANALYSING AND ESTIMATING OPTIMAL PARAMETERS OF JET ENGINE PARTS PRODUCTION

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**N**ickel-based superalloys can be characterized by resistance to high-temperature corrosion and high-temperature creep resistance. For this reason, they are widely used in the production of jet engine critical parts. One of the commonly used materials is Inconel 625, which will be the subject of this research. For Inconel 625 processing, rotary forming can be applied, which results in axially symmetrical elements. An important property of Inconel 625 is strong strain hardening effect. To improve formability, variety of methods can be applied, including heating of the material. The purpose of the research was optimization of rotary forming process parameters of Inconel 625 to produce jet engine critical parts with high quality requirements. Scans data were processed in GOM Inspect software. For further analysis, thickness and surface deviations for all points and zones of interest were needed, as well as various statistics as extrema, standard deviation, deviation distribution, and tolerance tests. As obtaining this data manually would be extremely time consuming, Python scripting GOM API was utilized. With created scripts we automated loading, aligning, comparing of scans and CAD model, calculating measures and required statistics. Generated data was then used in multivariate optimisation for selecting optimal process parameters. Deviation statistics were modelled with regression models, predicting selected quality measures depending on trials parameters. Based on these models, overall quality function was maximised with GridSearch approach, yielding optimal parameter for the process.

## Biography

Sandra Puchlerska is pursuing her PhD at the AGH University of Science and Technology, Faculty of Non-ferrous Alloys. She has graduated in Materials Engineering with thesis about Microstructure evolution in superalloy Inconel 718 during laser heating. She is Member of the Laboratory of Production Engineering. She realized grants in the field of aluminium alloys heat treatment, metal forming of jet engines elements, investment casting of critical elements dedicated to aircraft industry. She is an author of 37 publications and conference papers. She has participated in many international conferences. Her fields of interest are Metal Forming, Superalloys, NDT, Microstructure of Nickel Superalloys, Thermovision and 3d Scanning.

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