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Model-Based Process Development for the Comparison of a Radial Riveting and Roller Burnishing Process in Mechanical Joining Technology

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Abstract : Modern simulation methodology using finite element models is nowadays a recognized tool for product design/optimization. Likewise, manufacturing process design is increasingly becoming the focus of simulation methodology in order to enable sustainable results based on reduced real-life tests here as well. In this article, two process simulations -radial riveting and roller burnishing- used for mechanical joining of components are explained. In the first step, the required boundary conditions are developed and implemented in the respective simulation models. This is followed by process space validation. With the help of the validated models, the interdependencies of the input parameters are investigated and evaluated by means of sensitivity analyses. Limit case investigations are carried out and evaluated with the aid of the process simulations. Likewise, a comparison of the two joining methods to each other becomes possible.

Keywords : FEM, model-based process development, process simulation, radial riveting, roller burnishing, sensitivity analysis
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