Lehrstuhlleitung: Prof. Dr.-Ing. Achim Kampker
Besuchen Sie uns: www.pem.rwth-aachen.de

Master Thesis / Bachelor Thesis

Next Generation E-Drive Production: Simulation of mechanical joining processes for connecting rectangular copper conductors using FEA

Source: PEM

Initial Situation:
The ongoing electrification of the global vehicle fleet is leading to an increasing importance of electric traction drives. A central field of innovation for E Drives is stator production in the hairpin design, a coil structure made of solid electrical conductors, which is increasingly replacing conventional round wire winding techniques. The production process of hairpin technology is subject to many process influences, which lead to efficiency and quality losses in series production. The contacting of the hairpin copper ends by laser welding represents a key process in the hairpin process chain and requires precise geometric weld seam preparation, such as a zero gap. Alternative joining mechanisms were developed as part of the "anfaHair" project.

Your Task:
You create simulation models (FEA) for two newly developed mechanical joining processes for copper flat conductors, which are based on the processes of forming technology. To do this, you first derive the joining method into a basic model and define variable geometry and joining parameters. You also determine the necessary material and constraints. You carry out your simulation, check it for plausibility and validate it using empirical tests that have already been carried out. Then you have to improve the properties and quality of the joint with the help of a simulative optimization and develop the optimal process and geometry parameters. Finally, you create a prognosis for proving the suitability of the joining processes.

What is required:
- Studies in engineering, computer science (or comparable)
- Structured way of working and analytical mindset
- Experience in the simulation of forming processes

What is offered:
- Delimited tasks and flexible processing
- Professional supervision and insight into industry and practice
- Fast and independent execution

Interested?
Please send a current transcript of grades as well as your CV and references to the e-mail address below.

Your Contact:
Christian Stäck, M.Sc.
c.staeck@pem.rwth-aachen.de