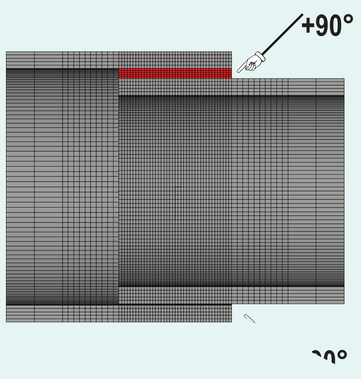
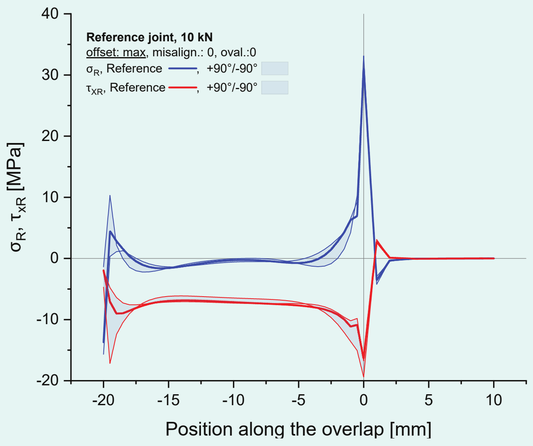
Modelling the strength of adhesively bonded G-FRP tube connections

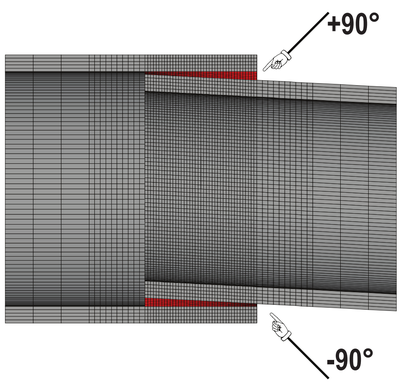
T. Vallée*, M. Voss*, M. Kaufmann*, M. Albiez**

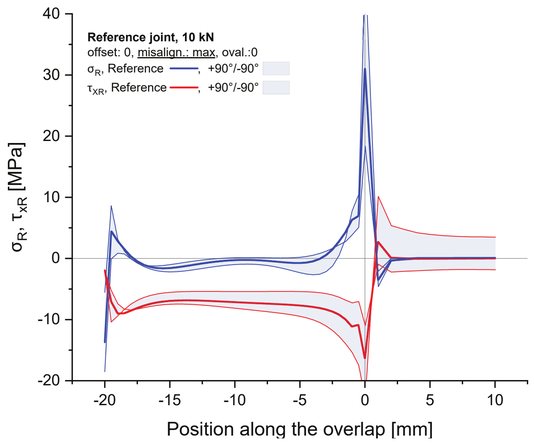
* Fraunhofer Institute for Manufacturing Technology and Advanced Materials IFAM, - Bremen (DE)
** Karlsruher Institut für Technologie, Steel and Lightweight Structures - Karlsruhe (DE)

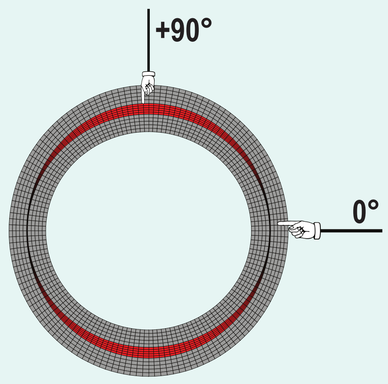
This last paper of a series of three concludes the analysis of a series of adhesively bonded tube-in-tube (TiT) joints composed of glass-fibre reinforced polymers (G-FRP) for which induction heating with Curie-particles (CP) was used to accelerate curing. It focuses on the prediction of their load capacity using a probabilistic method (PM). First, the G-FRP material was characterised with regard to transverse (tensile) and shear stresses, which allowed to determine a valid failure criterion, including the related statistical description subsequently required for the PM. Then, finite element analysis (FEA) was used to determine the stresses within the TiTs, for not only a perfect geometry, but also considering a series of possible geometrical imperfections (offset and misalignment of the centrelines, and ovalisation) with three degrees of severity. The influence of aforesaid imperfections on stresses was determined, and discussed. Based thereupon, load capacity was numerically determined, compared to the experimental values, and the influence of imperfections highlighted. Predicted joint capacities agreed well with the experimental ones. *Voß, Morten, Till Vallée, and Marvin Kaufmann: "Accelerated curing of adhesively bonded G-FRP tube connections—Part III: Modelling of strength." Composite Structures 268 (2021)*

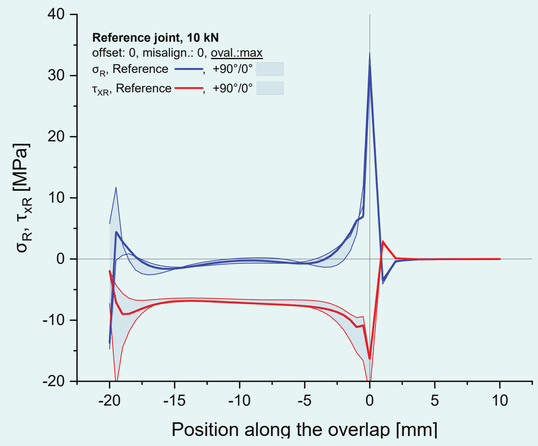


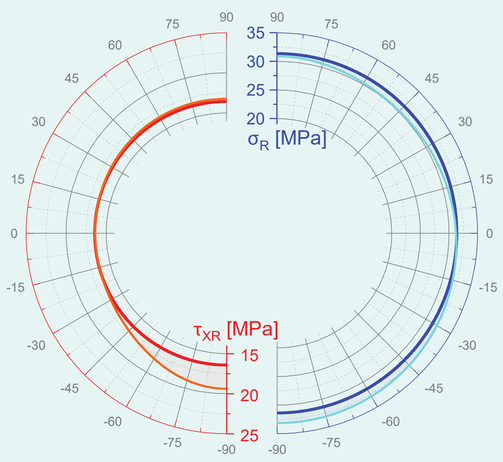


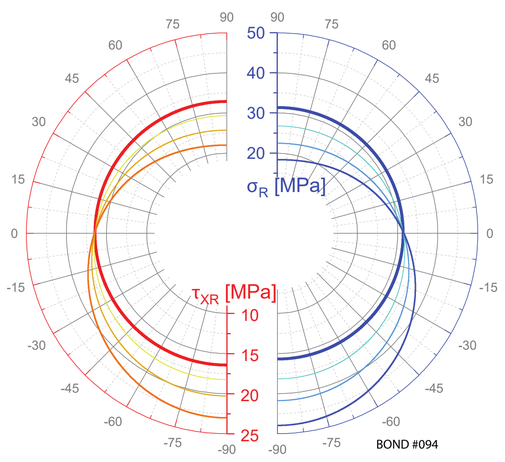


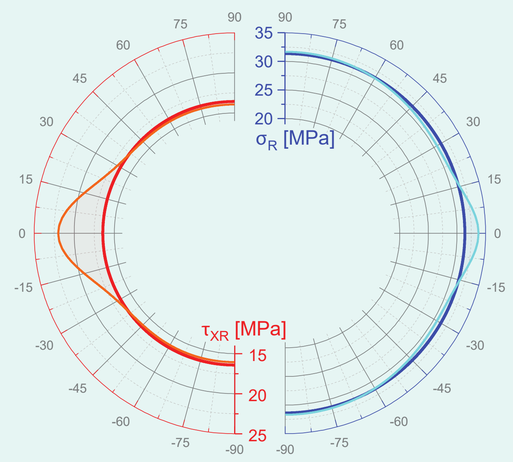


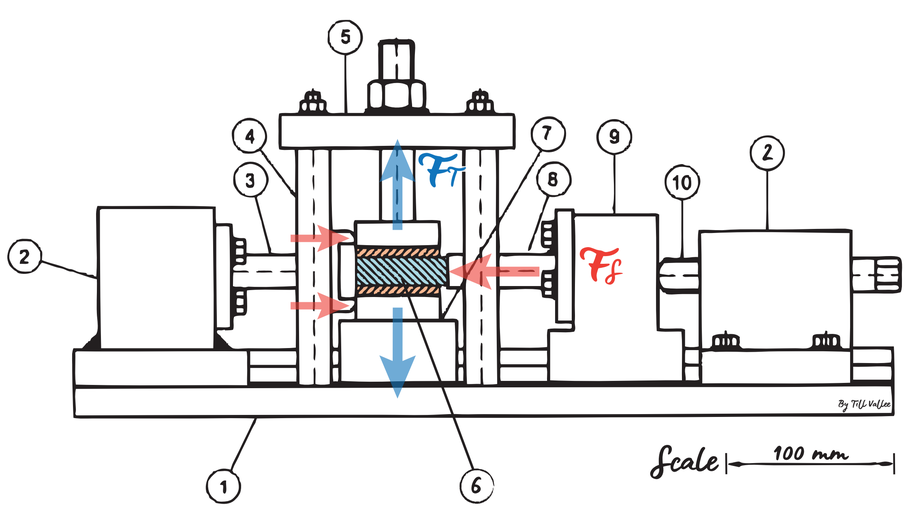


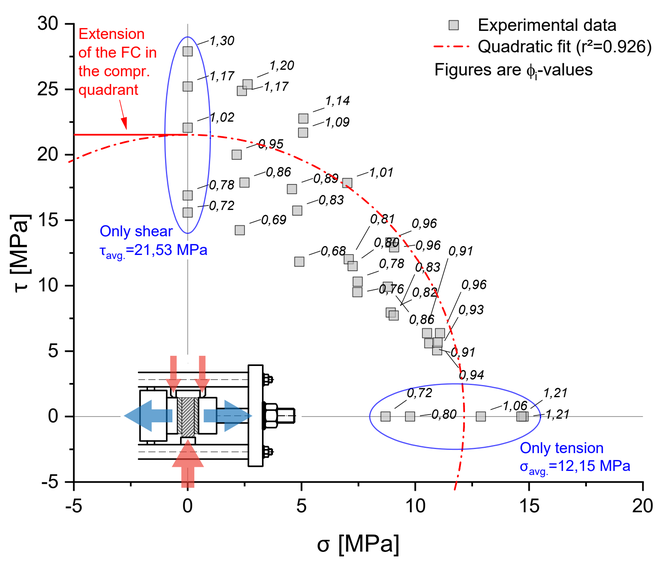


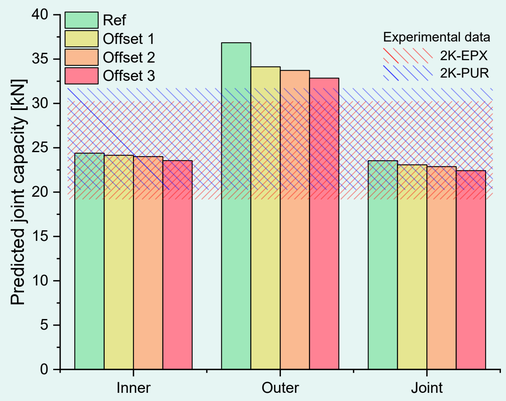


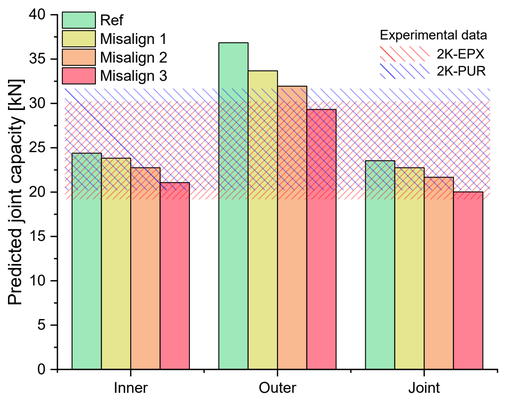


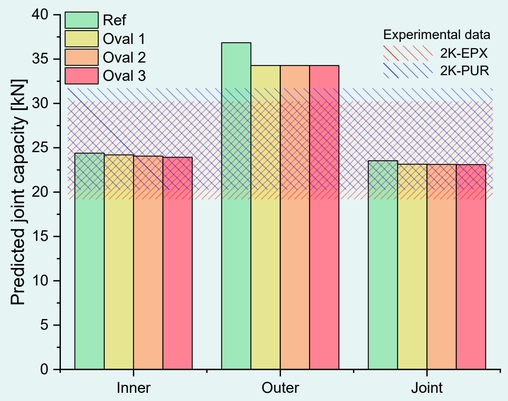












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