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# ● Modelling the strength of adhesively bonded G-FRP tube connections

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**Abstract content**

This presentation complements 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. The influence of centreline offset and ovalisation was found to be of minor importance, if compared to that of the misalignment. By an extension of the procedure, scattering of the experimental data was also predicted in form of upper and lower quantiles, which also agreed well.

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**References**
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The meshed FE model, top-left: the reference joint