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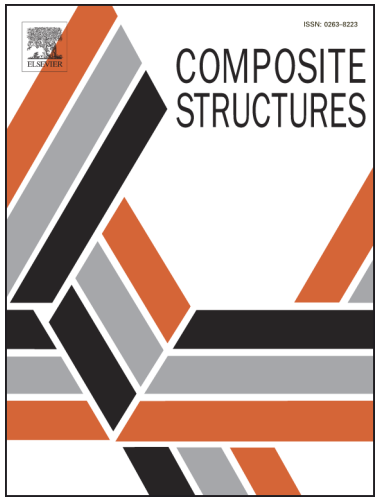


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PII: S0263-8223(16)31763-9
DOI: http://dx.doi.org/10.1016/j.compstruct.2016.12.006
Reference: COST 8061

To appear in: *Composite Structures*

Received Date: 5 September 2016
Revised Date: 8 November 2016
Accepted Date: 5 December 2016

Please cite this article as: Qiu, C., Feng, P., Yang, Y., Zhu, L., Bai, Y., Joint capacity of bonded sleeve connections for tubular fibre reinforced polymer members, *Composite Structures* (2016), doi: http://dx.doi.org/10.1016/j.compstruct.2016.12.006

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# JOINT CAPACITY OF BONDED SLEEVE CONNECTIONS FOR TUBULAR FIBRE REINFORCED POLYMER MEMBERS

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**Abstract:**

Bonded sleeve joints formed by telescoping a steel tube connector for bolt-fastening are effective means for assembling tubular fibre reinforced polymer (FRP) members into more complex structures such as planar or space frames. A theoretical formulation is developed in this paper to estimate the capacity of such joints in axial loading and the predictions are validated by experimental results covering various section geometries and bond lengths. The formulation is based on the bilinear bond-slip constitutive relationship considering elastic, softening and debonding behaviour at the adhesive bonding region. Finite element (FE) analysis is also conducted to estimate the joint capacity and to describe shear stress distribution in the adhesive layer, validating the reliability of the theoretic results. The theoretical formulation is therefore further used to study the effects of design parameters including bond length and adherend stiffness ratio, again validated by FE results. An effective bond length can be accurately predicted by the theoretical formulation for the joint capacity at both the elastic limit and the ultimate state. Given a bond length, an optimal adherend stiffness ratio can be identified to achieve the maximum joint capacity at the elastic limit or the ultimate state.

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