
Hybrid connections in load bearing structures of wind turbines

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Résumé

Current off-shore structures for wind turbines consist of truss structures (called jackets) composed of steel tubes. Such structures are used for water depths beyond 50 m. Up to now, the tubular members of the lattice structures are connected by means of welding. However, welding has several disadvantages; it is critical regarding the manufacturing process, and negatively impacts service life. A recently completed research program shows the great potential of bonding technology for applications in steel construction [1-2]. Based on the aforementioned, a new type of hybrid joint was developed with the purpose to be implemented at structural level. This approach aims at combining the advantages of adhesive bonding, bolting, and welding in one hybrid joint to more optimised structural steel structures.

This paper presents different steps of the development of the hybrid joint and a series of experimental validations. Based upon realistic mechanical and climatic loadings, off-shore structures are subject to numerical investigations which allow the determination of the stresses acting in offshore jackets. Different adhesives were screened thereupon, and their performance in the considered hybrid connections were assessed in large-scale tests under static and fatigue loads. Durability studies complete the contribution.

M. Albiez, T. Vallée, H. Fricke, T. Ummenhofer. "Adhesively bonded steel tubes-Part I: Experimental Investigations." *International Journal of Adhesion and Adhesives* (2018).

M. Albiez, T. Vallée, T. Ummenhofer. "Adhesively bonded steel tubes-Part II: Numerical modelling and strength prediction." *International Journal of Adhesion and Adhesives* (2018).

Mots-Clés: adhesive Bonding, steel structures, offshore structures, simulation, experimental testing

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