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Jesus Toribio

University of Salamanca, Spain

Fracture and structural integrity issues in wind turbines: Recalling miguel de cervantes and antonio vivaldi

Wind turbines are key elements in the field of renewable energies. They can be considered as engineering evolutions of old-fashion windmills appearing in the master work by Miguel de Cervantes: Don Quijote de la Mancha. The main subject of this paper is related to fracture behavior and structural integrity of cold drawn pearlitic steel wires (prestressing steel wires) for wind turbine structures and foundations. At the microscopic level, cold drawing generates progressive slenderizing and orientation/alignment of the pearlitic colonies (1st microstructural level) and increasing orientation/alignment and densification of the ferrite/cementite lamellae (2nd microstructural level), thereby inducing anisotropy of fatigue and fracture resistance and its associated effect on crack paths. Special attention is paid to the fatigue phenomenon produced in the turbines as they are shaken (or agitated) by the wind, thus recalling "Agitata da due venti" by the master Antonio Vivaldi in the dramma per musica (opera) "Griselda".

Biography

Jesus Toribio is a ESIS Fellow (ESIS: European Structural Integrity Society), ICF Director (ICF: International Congress of Fracture), and Chairman of ESIS TC10 Committee on Environmentally Assisted Cracking (EAC) and Hydrogen Embrittlement (HE) He is a Founder Member of the Spanish Fracture Group and Head of Structural Integrity Research Group, Department of Materials Engineering, University of Salamanca, Spain

toribio@usal.es