Research Grants for PhD students from the China Scholarship Council

Information Form (please read the guidelines carefully on the website www-csc.utt.fr)

Supervisor's name : Kouadri-Henni Given names : Afia

Status (prof., assistant prof., …) : associate professor

Laboratory : LS2N- Romas Team Website address :

Institution : INSA of RENNES Website address : https:/www.insa-rennes.fr

Scientific competence of the supervisor:

Specialist of laser beam process, residual stresses generated by laser, mechanical behavior, cycle fatigue, microstructure of welded structure, simulation by Abaqus

Two major publications in the field proposed for the PhD :

1. Shibo Liu, Afia Kouadri-Henni, Adinel Gavrus, Numerical simulation and experimental investigation on the residual stresses in a laser beam welded dual phase DP600 steel plate: Thermo-mechanical material plasticity
2. A. Kouadri-Henni, C. Seang, B. Malard, V. Klosek, Residual stresses induced by laser welding process in the case of a dual-phase steel DP600: Simulation and experimental approaches, Materials and Design, 2017, DOI:

Website address of the personal page :

Supervisor's email : afia.kouadri-henni@insa-rennes.fr

Description of the research work proposed for a PhD ***Topic # (see list) :*** IV.8

Title : Numerical and experimental study on residual stresses after weldind and after cycle fatigue: laser beam welding of dual phase DP600 stell plates

Subject :

The thesis aims to explore the influencing mechanism of DP600 laser welding residual stress on low-cycle fatigue properties. Parameters of impulsionnel laser welding will be studied. First, laser welding residual stress will be acquired by the sequential-coupled thermo-mechanical model containing the heat source model and different plastic material constitutive models. And the obtained residual stress will be imported as the predefined stress field for the following simulation. Then, the direct cyclic technique and combined hardening models will be employed to evaluate the low-cycle fatigue residual stress. Moreover, the effects of anisotropy on laser welding and low-cycle fatigue residual stress wil be investigated. Finally, the influences of laser welding residual stress on low-cycle fatigue properties will be discussed, and models will be constructed to predict the residual stress relaxation and fatigue life. All simulation results will be verified by experimental data (X-ray, neutron diffraction). The microstructure will be too realized.

Keywords :

residual stresses, laser beam process, cycle fatigue, microstructure, DP600 steel, simulation

Expected collaborations :

no

Background required from the applicant :

metallurgical and mechanical behavior, welding, effects of welding on the structues, simulation

Existence of a PDF file detailing the proposal ("yes" or "no") : yes

(see guidelines on the website www-csc.utt.fr)