

Numerical simulation on the residual stress of Nd:YAG laser welding DP600

Shibo LIU Encadrante: Mme Afia KOUADRI-HENNI

INSA de Rennes







Dual-Phase (DP) material is widely used in automobile industry.

Hard martensite phase

High strength

Soft ferrite phase

Adequate ductility







Stress corrosion cracking (SCC)

des

ut National

• Crack initiation and propagation. (Damage tolerance)

For the reasons above, the residual stress after welding of DP600 is studied.







Along different directions, elasto-plastic responses of DP600 are different

With the change of microstructure locally, the anisotropy is changed.

Microstructure evolution of cold rolling^[2]

Anisotropy influence on residual stress distribution after welding is complex

[2] Karlsruche Institute of Technology, Project A1: Microstructure evolution during rolling and recrystallization





5



Rectangular transition type



(8-node brick, C3D8)

(20-node brick, C3D20)







Sciences

t National des









Along transversal line of weld, the up surface is examined by XRD, the interval is 1mm with 17 points.

The examine of residual stress needs long time, only part of result is presented at presented. From figure right, the simulation result agrees well with experiment observation.



