



Numerical Simulation and Experimental Investigation of the Fracture Behaviour of an Electron Beam Welded Steel Joint

By Haoyun Tu

Springer-Verlag GmbH Okt 2017, 2017. Buch. Condition: Neu. Neuware - In this thesis, the author investigates experimentally and numerically the fracture behavior of an electron beam welded joint made from two butt S355 plates. The 2D Rousselier model, the Gurson-Tvergaard-Needleman (GTN) model and the cohesive zone model (CZM) were adopted to predict the crack propagation of thick compact tension (CT) specimens. Advantages and disadvantages of the three mentioned models are discussed. The cohesive zone model is suggested as it is easy to use for scientists & engineers because the CZM has less model parameters and can be used to simulate arbitrary crack propagation. The results shown in this thesis help to evaluate the fracture behavior of a metallic material. A 3D optical deformation measurement system (ARAMIS) and the synchrotron radiation-computed laminography (SRCL) technique reveal for the first time the damage evolution on the surface of the sample and inside a thin sheet specimen obtained from steel S355. Damage evolution by void initiation, growth and coalescence are visualized in 2D and 3D laminographic images. Two fracture types, i.e., a flat crack propagation originated from void initiation, growth and coalescence and a shear coalescence mechanism are visualized in 2D and 3D...



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