29-8 A Damage Criterion for Macrocrack Initiation in Welded T-Joints

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From the physical point of view, damage is related to the process initiation growth of micro-voids and cavities. Lamatre presented a model for isotropic ductile plastic danage based on a continuum damage variable in the effective stress concept and on the thermodynamics. In steel structures, ductile macrocracks often initiate at weld toes after structures sustain excessive plastic strain.During the damage process,the accumulated plastic strain and stress triaxiality are two important factors affecting macrocrack initiation. In this paper, based on the Lamatre's damage model, a damage criterion at macrocrack initiation is proposed for welded T-joints in triaxial stress state. Tests on T-joints under combined tensile and bending loads are carried out. FE analyses are performed to investigate stress triaxility and plastic deformations. Finally, damage criterion curves verified by FE results.

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