Numerical Study of Effects of Superimposed Pressure on Fracture

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It has been generally accepted that superimposed hydrostatic pressure increases the ductility of metals due to the fact that a superimposed pressure delays or completely eliminates the nucleation, growth and coalescence of micro-voids or micro-cracks. However, to the best of our knowledge, numerical simulation of uniaxial tension under superimposed hydrostatic pressure has not been reported. In this paper, finite element analysis is carried out to study effects of superimposed hydrostatic pressure on fracture in sheet metals under in-plane plane strain tension. All the simulations are based on the Gurson damage model. Numerical results are found to be in good agreement with experimental observations.