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# Size-Effects in Void Growth

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The size-effect on ductile void growth in metals is investigated. The analysis is based on unit cell models both of arrays of cylindrical voids under plane strain deformation, as well as arrays of spherical voids using an axisymmetric model. A recent finite strain generalization of two higher order strain gradient plasticity models is implemented in a finite element program, which is used to study void growth numerically. The results based on the two models are compared. It is shown how gradient effects suppress void growth on the micron scale when compared to predictions based on conventional models. This increased resistance to void growth, due to gradient hardening, is accompanied by an increase in the overall strength for the material. Furthermore, for increasing initial void volume fraction, it is shown that the effect of gradients becomes more important to the overall response but less important to the suppression of void growth.

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