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Embedded Cohesive Elements (ECE) Approach to the Simulation of Spall Fracture Experiment NICOLA BONORA, LUCA ESPOSITO, ANDREW RUGGIERO, University of Cassino, Italy — Discrepancies between the calculated and observed velocity vs time plot, relatively to the spall signal portion in terms of both signal amplitude and frequency, in numerical simulations of flyer plate impact test are usually shown. These are often ascribed either to material model or the numerical scheme used. Bonora et al. (2003)[Bonora N., Ruggiero A. and Milella P.P., 2003, *Fracture energy effect on spall signal*, Proc. of 13^{th} APS SCCM03, Portland, USA] showed that, for ductile metals, these differences can be the imputed to the dissipation process during fracturing due to the viscous separation of spall fracture plane surfaces. In this work that concept has been further developed implementing an *embedded cohesive elements* (ECE) technology into FEM. The ECE method consists in embedding cohesive elements (normal and shear forces only) into standard isoparametric 2D or 3D FEM continuum elements. The cohesive elements remain silent and inactive until the continuum element fails. At failure, the continuum element is removed while the ECE becomes active until the separation energy is dissipated. Here, the methodology is presented and applied to simulate soft spall in ductile metals such as OHFC copper. Results of parametric study on mesh size and cohesive law shape effect are presented.

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