

Ductile fracture

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An increased interest in ductile fracture understanding and modeling for complex loading paths has been observed in the scientific community during the last decade. This increased interest is partly due to the fact that conventional ductile damage models and ductile fracture criteria fail to accurately predict ductile failure for complex non-proportional loading paths and for novel advanced materials.

The purpose of this minisymposium is to discuss these models and criteria, to identify their limitations and to come up with new ideas and solutions regarding ductile fracture. This symposium will also be the place for discussions regarding the physical mechanisms of ductile damage under complex loading paths and to discuss the computational challenges associated to ductile damage, both at the micro-scale and at the macro-scale.

A diverse variety of topics will be addressed, including:

- Ductile fracture at multiple scales, including micromechanical analyses accounting for materials' microstructural heterogeneities;
- Complex loading conditions: large plastic strain, multiaxial and non-proportional loadings, effect of strain rate;
- Ductile failure under shear loading and modeling of shear bands;
- Competition between damage growth and localization phenomena;
- New mathematical formulations and numerical solution strategies dedicated to efficient modelling of continuum ductile damage and its transition to discontinuous fracture;
- Theoretical and numerical aspects related to advanced fully coupled constitutive equations including time and space discretization, mesh dependence, meshless methods, solution strategies, etc.;
- Experimental observations or quantitative characterization of ductile failure mechanisms in support of computational modelling or giving guidance to the development of new computational models;
- Methodologies for proper damage models calibration.

Theoretical, computational and materials studies related to ductile fracture, shear bands and necking are welcome to the minisymposium.