14th World Congress on Computational Mechanics (WCCM XIV)
8th European Congress on Computational Methods in Applied Science and Engineering (ECCOMAS 2020)
July 19–24, 2020, Paris, France

ADVANCEMENTS IN COMPUTATIONAL PORO-PLASTICITY AND DUCTILE FRACTURE MODELING
100 - FRACTURE, DAMAGE AND FAILURE MECHANICS

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Key words: Poro-plasticity, Materials Modeling, Ductile Fracture

ABSTRACT

Many modern metals are less than fully dense with a finite porosity created either unintentionally (as in additively manufactured or powder processed materials) or intentionally (as in metallic meta-materials and foams). Other materials form porosity under high-loading rates or adverse structural loading conditions and are precursors to ultimate failure. The broad opportunities associated with designing and understanding these materials, along with modern microscopy techniques—that measure 3D porosity structures—have renewed an interested in computational poro-plasticity. The complexities in computational representation of these types of materials for structural applications are of interest to this gathered community. This mini-symposium welcomes advancements in porosity models for the mentioned classes of materials coupled with other materials modeling methods, including but not limited to: crystal plasticity, cohesive zone fracture, X-FEM fracture, and dislocation dynamics. Applications to high-loading rates, addressing microinertia and viscous damping, are encouraged along with static loading applications over varying triaxialities and Lode parameters. Computational materials models validated using micro-tomography, small angle X-ray scattering, or other experimental method are also encouraged.