Finite element implementation of the tension-shear coupled fracture criterion for numerical simulations of brittle-ductile transition in silicon carbide ceramic grinding

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Highlights

- The tension-shear coupled fracture criterion was proposed to simulate the brittle-ductile transition phenomenon in the brittle materials machining process.
- Tension-shear coupled fracture criterion is more suitable than the equivalent plastic strain fracture criterion for the simulation of brittle materials precision machining.
- The equivalent plastic strain parameter could be used to distinguish the materials removed in ductile mode or brittle mode.
- Even though the materials removed in brittle mode, the plastic deformation may happen and residual stress may be left on the machined surface or subsurface.