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# Stability and Creep Damage of Quasi-Brittle Materials

**Noel Challamel**, Christophe Lanos, Charles Casandjian

*INSA de Rennes, Rennes, France*

Design of reliable concrete structures subjected to high level and long time loading has to integrate the coupling between softening and time-dependence of microcracking. A time-dependent damage model is developed for quasi-brittle materials like rock or concrete, in the framework of Continuum Damage Mechanics. The three-dimensional model is based on strong thermodynamical arguments. Phenomena like relaxation, creep and rate-dependent loading are covered using a unified framework. As for endochronic models, no initial threshhold is assumed. Nevertheless, an apparent elastic domain is identified for constant strain rate tests, which reveals the competition between the internal kinetics of damage and the strain rate imposed on the material. Creep failure under high-sustained load is explained quite simply within stability theory. Kachanov's equation is commented within the new approach. Creep failure appears as the manifestation of a bifurcation phenomenon.

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