

where $(\lambda / \mu)_0$ is the peak event rate at the start of the final acceleration at time t_0

numerical results from the bulk shear model if γ^* is reinterpreted as

$$\gamma^* = \left[\frac{\sigma_c^2}{(1 - \nu)} \right] \left[\frac{U_c}{\rho} \right] \quad (5)$$

where σ_c is now the critical stress in tension.

4. Critical Strain for Bulk Failure

[11] Equations (3) and (5) imply that γ^* is the ratio, per unit volume, of the energy for tensile failure $\left[\frac{\sigma_c^2}{(1 - \nu)} \right] \left[\frac{U_c}{\rho} \right]$ to a rock's internal energy $\left[\frac{U_c}{\rho} \right]$. This interpretation, however, does not explain why γ^* should show a restricted range of values. From classical thermodynamics [17, 1992], atoms in solids have an average potential energy, associated with elastic deformation, of $(1/2) \left[\frac{U_c}{\rho} \right]$ for each of their three components of motion. Because the strain at failure, ϵ , can be defined as the ratio, per unit volume, of [Strain Energy for Fracture] to [Initial Potential Energy], it follows that $\epsilon = (2/\gamma^*)$.

