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Class 27 Highlights

In class on Friday, we began by discussing Conservation of Energy and the first law of thermodynamics. We begin by examining P, the term for the rate of work done on the system, and defining it as the sum of the work done on the boundary and the body force term. We find that there is no final dependence of P on the body forces because body forces acting alone do no work. Finally, we find an equation for the rate of change of total energy $\dot{E}$, in terms of the stress power density $\dot{U}$, the kinetic energy $\dot{T}$, and the rate of heating $\dot{U}$. Finally, we discussed Griffith's 1923 theory for fracture mechanics, in which he examines how cracks propagate in rocks. He finds that there is a critical crack length at which cracks change from a stable to an unstable configuration that leads to unstable crack growth.