

Please answer all questions in the homework format listed on the website.

- 1) Dowling, Problem 4.6.
- 2) Consider a sample of titanium (Table 5.2) subjected to compression in the z -direction of 100 MPa and confined by a rigid die in the x - and y -direction so that it cannot deform in either of those directions as shown in Figure 1. (a) What are the stresses in the x - and y -directions? (b) What is the effective stiffness in the z -direction? (c) What is the volumetric strain? (d) What is the hydrostatic stress?

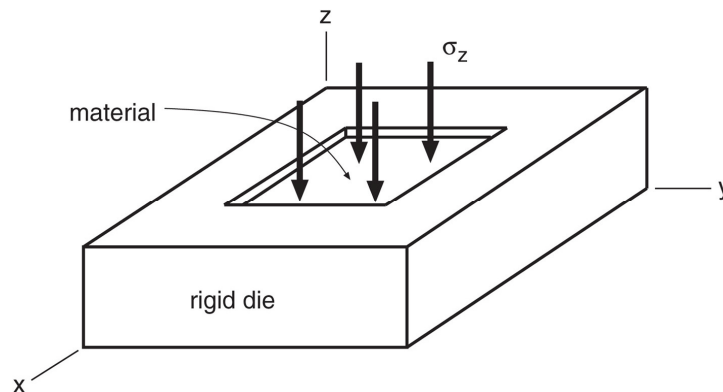


Figure 1. Material in rigid die subjected to compressive load σ_z .

A few solutions to the suggested problems in Dowling.

Dowling 4.9 Ans: $E = 155.5$ GPa, %el = 0.816% (at fracture), 0.48% (after fracture)

Dowling 5.16 Ans: $\epsilon_z = -737$ $\mu\epsilon$

Dowling 5.19 Ans: $\Delta r = pr^2(1-\nu)/(2tE)$

Dowling 7.23 assume $\sigma_0 = -260$ MPa, $\nu = 0.293$ in compression, Ans: (c) -444 MPa