

Using (13) and (14) in conjunction with the yield criteria, equation (8), the following stress difference is obtained.

$$\sigma_r - \sigma_\theta = \frac{\bar{\sigma} (\epsilon_\theta - \epsilon_r)}{\sqrt{3} [\epsilon_r^2 + \epsilon_r \epsilon_\theta + \epsilon_\theta^2 + \frac{1}{4} \gamma_{rz}^2]}^{1/2} \quad (15)$$

Substituting (15) into (14) yields

$$\tau_{rz} = \frac{\bar{\sigma} (\gamma_{rz})}{2\sqrt{3} [\epsilon_r^2 + \epsilon_r \epsilon_\theta + \epsilon_\theta^2 + \frac{1}{4} \gamma_{rz}^2]}^{1/2} \quad (16)$$

Equations (15) and (16) can be expressed in terms of the effective strain as

$$\sigma_r - \sigma_\theta = \frac{2\bar{\sigma}}{3\bar{\epsilon}} (\epsilon_r - \epsilon_\theta) \quad (17)$$

$$\tau_{rz} = \frac{\bar{\sigma}}{3\bar{\epsilon}} (\gamma_{rz}) \quad (18)$$