part by the experimental results.

The flow laws identify the stress-strain state while the material is undergoing plastic deformation. St. Venant's theory may be written in tensor notation as

$$S' = 2\lambda \dot{E}', \quad E'' = 0 \tag{5}$$

where

S' = deviator stress tensor

$\dot{E}'$ = deviator strain-rate tensor

λ = variable scalar factor

E'' = spherical strain tensor

($E'' = 0$ is a statement of volume constancy)

The expansion of this tensor equation is presented in References (k) and (l), and when combined with the law of proportional straining, equation (4), the resulting stress-strain relations, valid in the plastic domain, can be written as

$$\frac{2\sigma_\theta - \sigma_r - \sigma_z}{2\sigma_r - \sigma_\theta - \sigma_z} = \frac{\epsilon_\theta}{\epsilon_r} \tag{6}$$

$$\frac{2\sigma_z - \sigma_r - \sigma_\theta}{2\sigma_r - \sigma_\theta - \sigma_z} = \frac{\epsilon_z}{\epsilon_r}$$

$$\frac{6\tau_{rz}}{2\sigma_r - \sigma_\theta - \sigma_z} = \frac{\gamma_{rz}}{\epsilon_r} \tag{7}$$