厚壁圆筒屈服公式

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$$\sigma_r-\sigma_\theta=\frac{2\frac{b^2}{r^2}}{\frac{b^2}{a^2}-1}p_a \qquad \sigma_i=\frac{1}{\frac{b^2}{a^2}-1}\sqrt{\frac{1}{2}\left[\left(\frac{2b^2}{r^2}\right)^2+\left(\frac{b^2}{r^2}\right)+\left(\frac{b^2}{r^2}\right)\right]}$$

$$\sigma_r-\sigma_z=\frac{\frac{b^2}{r^2}}{\frac{b^2}{a^2}-1}p_a \qquad =\frac{\sqrt{3}}{\frac{b^2}{a^2}-1}\left(\frac{b}{r}\right)^2.$$

$$\sigma_\theta-\sigma_z=\frac{\frac{b^2}{r^2}}{\frac{b^2}{a^2}-1}p_a \qquad =\frac{\sqrt{3}\left(\frac{b}{r}\right)^2}{\frac{b^2}{a^2}-1}p_a=\frac{\sqrt{3}\frac{b^2}{r^2}}{\frac{b^2}{a^2}-1}p_a=\sqrt{3}p\frac{\frac{b^2}{r^2}}{\frac{b^2}{a^2}-1}$$

只：由屈服：$\sigma_i=\sigma_s$

即：$\dfrac{\sqrt{3}\frac{b^2}{r^2}}{\frac{b^2}{a^2}-1}p_a=\sigma_s$，则 $p_E \Rightarrow r=a$ 时，最先屈服

即：$\dfrac{\sqrt{3}\frac{b^2}{a^2}}{\frac{b^2}{a^2}-1}p_E=\sigma_s \qquad p_E=\dfrac{\frac{\sigma_s}{\sqrt{3}}\left[\frac{b^2}{a^2}-1\right]}{\frac{b^2}{a^2}}$

$$p_E=\frac{\sigma_s}{\sqrt{3}}\left[1-\frac{a^2}{b^2}\right]$$