p8-11

Equations

Problem 8.11

This involves a circular hole in a plate under uni-axial tension

Data on the hole

$$d = 19.0 \tag{1}$$

Data on the plate

$$t = 12.7 \tag{2}$$

$$w = 127 \tag{3}$$

$$L = 254 \tag{4}$$

Stress

$$\sigma = 345 \tag{5}$$

Part a) Stress is applied in lengthwise direction

$$dw_a = d/w \tag{6}$$

This value is 0.15 approximately. The figure gives ...

$$K_a = 2.55 \tag{7}$$

The maximum stress at the edge of the hole in this part is:

$$\sigma_a = K_a \cdot \sigma \tag{8}$$

Part b) We apply the load transverse to the length

$$dw_b = d/L \tag{9}$$

This value is 0.075 approximately. The figure gives ...

$$K_b = 2.65 \tag{10}$$

The maximum stress is now..

$$\sigma_b = K_b \cdot \sigma \tag{11}$$

Solution

$d = 19$ $\quad dw_a = 0.1496$

$dw_b = 0.0748$ $\quad K_a = 2.55$

$K_b = 2.65$ $\quad L = 254$

$\sigma = 345$ $\quad \boxed{\sigma_a = 880\,[\text{MPa}]}$

$\boxed{\sigma_b = 914\,[\text{MPa}]}$ $\quad t = 12.7$

$w = 127$