$$f_\sigma = \frac{slope}{w} \tag{6}$$

where the slope corresponds to the slope of the linear line found from the plot of load, P, versus light intensity, I, divided by the width, w, of the specimen.

The nominal stress in a plate without a hole is given by, σ_n,

$$\sigma_n = \frac{P}{wh} \tag{7}$$

Where the load force, P, is divided by the width, w, and thickness, h, of the plate.

The radial stress, σ_{rr}, is given by,

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$$\sigma_{rr} = \left(\frac{\sigma_n}{2}\right)\left[\left(1 - \frac{a^2}{r^2}\right) + \left(1 - \frac{a^2}{r^2}\right)\left(1 - \frac{3a^2}{r^2}\right)\cos 2\theta\right] \tag{8}$$

where, σ_n, is the nominal stress in the plate, a, is the radius of the hole, r, is the radial distance, θ, is the angle of the radial distance.

The hoop stress, $\sigma_{\theta\theta}$, is given by,

$$\sigma_{\theta\theta} = \left(\frac{\sigma_n}{2}\right)\left[\left(1 + \frac{a^2}{r^2}\right) - \left(1 + \frac{3a^4}{r^4}\right)\cos 2\theta\right] \tag{9}$$

where, σ_n, is the nominal stress in the plate, a, is the radius of the hole, r, is the radial distance, θ, is the angle of the radial distance.

The shear stress, $\sigma_{r\theta}$, is given by,

$$\sigma_{r\theta} = -\frac{\sigma_n}{2}\left(1 - \frac{a^2}{r^2}\right)\left(1 - \frac{3a^2}{r^2}\right)\sin 2\theta \tag{10}$$

where, σ_n, is the nominal stress in the plate, a, is the radius of the hole, r, is the radial distance, θ, is the angle of the radial distance.

The hoop stress is a principle stress when $r = a$ and $\sigma_{rr} = \sigma_{r\theta} = 0$ and is given by,

$$\sigma_{\theta\theta}(r = a) = \sigma_n(1 - 2\cos 2\theta) \tag{11}$$

where the nominal stress, σ_n, is multiplied by the cosine of the angle theta in degrees.

The stress concentration, S_c, is given by,

$$S_c = \frac{\sigma_{max}}{\sigma_n} = \frac{1}{\sigma_n}\frac{N_{max} f_\sigma}{h} \tag{12}$$