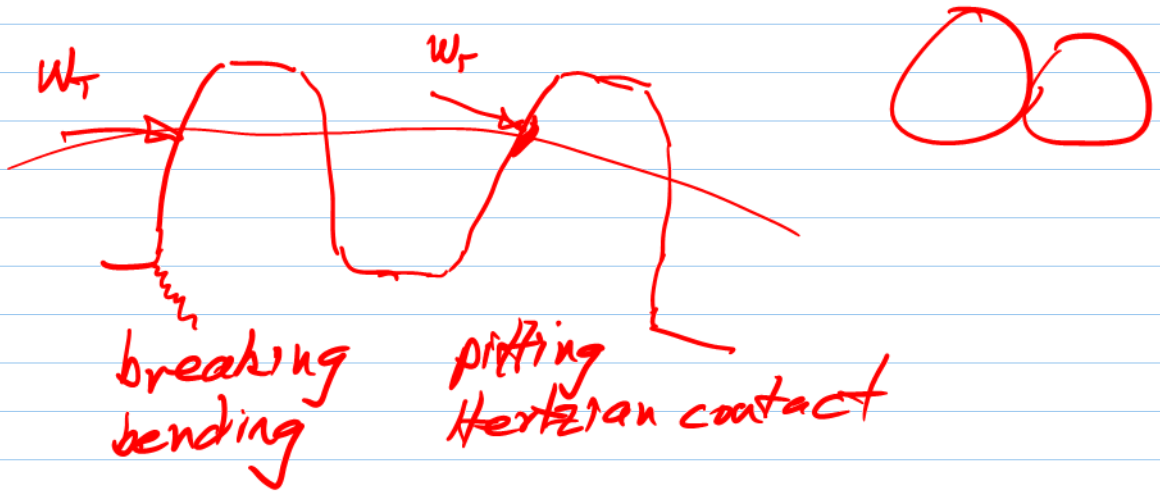
ME 360 21.11.15



$$\sigma_B = \frac{W_t P_d}{F J} \frac{K_a K_m}{K_v} K_s K_B K_I$$

W_t = tangential

P_d = diametral pitch = $\frac{N}{d}$

F = face width

J = AGMA form Tables 12-8 and 12-12

K_a = application Table 12-17

K_v = dynamic

need Q_v = quality number

$$K_v = \left(\frac{A}{A+\sqrt{V_t}}\right)^B \qquad \text{Eq 12.16us}$$

$$B = \frac{(12-Q_v)^{\frac{2}{3}}}{4} \qquad \text{for } 6 \le Q \le 11 \qquad \text{Eq 12.17b}$$

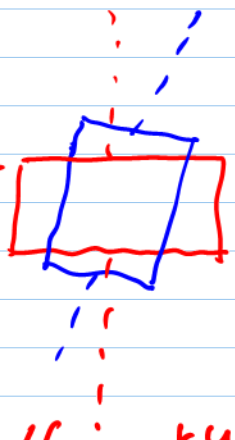
$$A = 50 + 56(1-B) \qquad \text{Eq 12.17a}$$

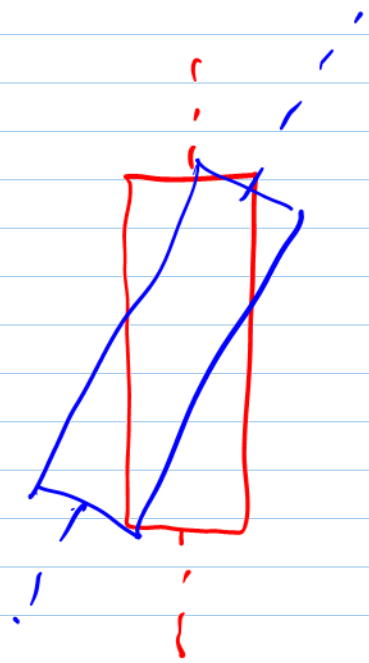
If $Q_v \le 5$ $K_v = \frac{50}{50+\sqrt{V_t}}$ Eq 12.19

K_M = load distribution factor

Table 12-16

angular misalignment





$\frac{8}{P_d} < F < \frac{16}{P_d}$ rule of thumb

K_S = size factor

not yet defined

$K_S = 1$

K_B = rim thickness factor

$m_B = \frac{t_R}{h_t}$ t_R = thickness rim

h_t = height of tooth = a + b

$K_B = -2m_B + 3.4$ $0.5 \le m_B \le 1.2$

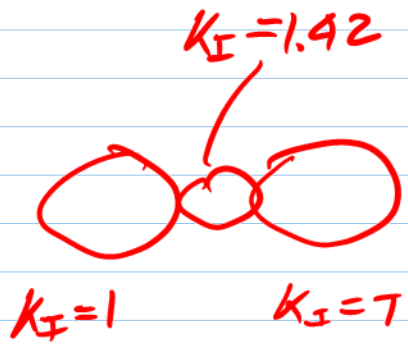
$K_B = 1.0$ $m_B > 1.2$

$K_B = 1.0$ solid gear

K_I = idler factor

$K_I = 1.42$ gear vs idler

$K_I = 1$ regular gear



compressive stress that causes pitting

$$\sigma_c = C_p \sqrt{\frac{W_t}{F I d} \frac{C_a C_m}{C_v} C_s C_f}$$

W_t = tangential load

F = face width

d = pitch diameter

C_p = function of $\nu_p E_p$ $\nu_G E_G$

I = function ρ_G ρ_p

$C_a = K_a$ $C_m = K_m$ $C_v = K_v$

C_f surface finish factor

C_s mystery ???