

4-12 & 4-13 :- Buckling

Euler column formula

$$\frac{P_{cr}}{A} = \frac{C\pi^2 E}{(L/k)^2}$$

k : radius of gyration

A : Area

C : end-condition constant

- if the point is under the curve \rightarrow **Stable**
- if the point is above the curve \rightarrow **Unstable**

Johnson Curve

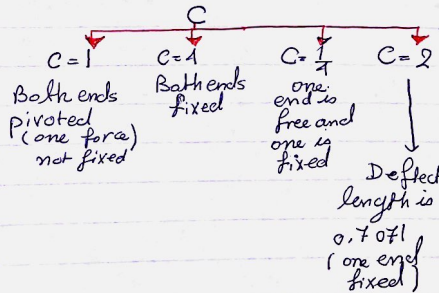
$$\text{obtain } \left(\frac{l}{k}\right) = \left(\frac{2\pi^2 CE}{S_y}\right)^{1/2}$$

if $\frac{l}{k} \leq \frac{l}{k_c} \Rightarrow$ use Johnson formula which is:-

$$\frac{P_{cr}}{A} = S_y - \left(\frac{S_y l}{2\pi k}\right)^2 \frac{1}{CE}$$

P_{cr} Given
or $P_{cr} = n_d P$
load applied
 n_d : design factor

Table A: 17



If there is Combined loadings
 \rightarrow I can't use formulas
 I use formulas only if there is one compression force

Difference between $C=1, C=2$ is that Deflection at 4 is full and at 2 is $= 0.707l$