Problemas sobre columnas

Jessica Aide Quirino-Murillo, Instituto Tecnológico Superior Zacatecas Occidente
Angel Osvaldo Quirino-Murillo, Affiliation not available
yeni araceli Reyes-Lopez, Instituto Tecnológico Superior Zacatecas Occidente

The formula for the critical load of a column was derived in 1757 by Leonhard Euler, the great Swiss mathematician. Euler's analysis was based on the differential equation of the elastic curve:

Equilibrio del momento requiere que MC X

$\frac{dv^2}{dx^{\ 2}} = FV$

$\frac{dv}{dx} = \frac{dv}{E1}$

$\frac{dv}{dx^2} + \left(\frac{p}{E1}\right) v = 0$

$\left(\frac{dv^2}{dx^2}\right) + \left(\frac{p}{E1}\right) V = 0$

Para resolver una ecuación diferencial debemos proponer una solución que la satisface.

$V = c1senx\ Y\ x + c1Yx$ o $V = C1SEN\sqrt{\frac{P}{C1}}X + C2\,COS\sqrt{\frac{P}{E1}}X$

$V' = \frac{DV}{DX} = C1\ Y\ COS\ Y\ X SEN\ YX$

$V' = \frac{dv^2}{dx^2} = c1Y\ ^2senY\ x - c1Yx$

$c1Y^2\ senYx - c1x + \left(\frac{p}{E1}\right)(C1\ senYx + c1x) = 0$

$c1Y^2senYx - c2Y^2x + c1\left(\frac{p}{E1}\right) sen\ Yx + c1\ \frac{p}{E1}\ (x) = 0$

$c1\ sen2x\left(\frac{p}{E1} - Y^2\right) + c2x\ \left(\frac{p}{E1} - Y^2\right) = 0$

$\frac{p}{E1} = Y^2 = \sqrt{Y} = \sqrt{\frac{p}{E1}}$

ecuaciones de frontera

v=0 1 x=0

v=0 1 x=0 calculando las variables c1 y c2

x=0

v=0

$c1\ sen\sqrt{\frac{p}{E1}(0)} + c2\cos\sqrt{\frac{p}{E1}}(0) = o$

=)c2=0

para v=0 1 x -l

$(v = x = L) = C1\ sen\sqrt{\frac{p}{E1}}l = 0$

$sen\left(\sqrt{\frac{p}{E1}}L\right) = 0$

$\sqrt{\frac{P}{E1}}L = M\pi$

$\frac{P}{E1}L^2 = \pi^2\ \ N^2$

$P = \frac{N^2\ \pi^2\ E1}{L^2}$

para calcular la carga critica= N1

$Pc = \ \frac{\pi^2\ e1}{l^2}$

la c1 representa que tanto se pandea la columna