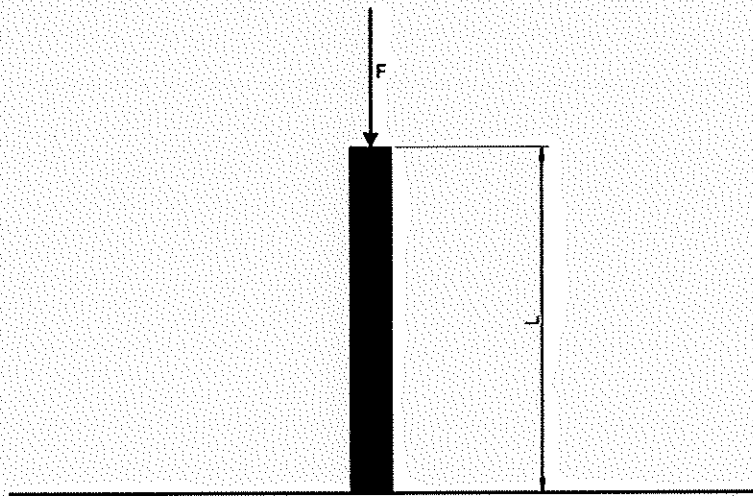


# Euler's Formula

Buckling of Columns under Load

## Extended Formula

Columns fail by buckling when their critical load is reached. Long columns can be analysed with the Euler column formula.



$$F = \frac{n \pi^2 EI}{L^2}$$

*where*

F = allowable load (N, lb.)

n = factor accounting for the end conditions

E = modulus of elasticity (lb./in<sup>2</sup>, Pa (N/m<sup>2</sup>))

L = length of column (in, m)

I = Moment of inertia (in<sup>4</sup>, m<sup>4</sup>)

### Factor Counting for End Conditions

- Column pivoted in both ends:  $n = 1$
- Both ends fixed:  $n = 4$
- One end fixed, the other end rounded:  $n = 2$
- One end fixed, one end free:  $n = 0.25$

