Cantilever Tapered Beam
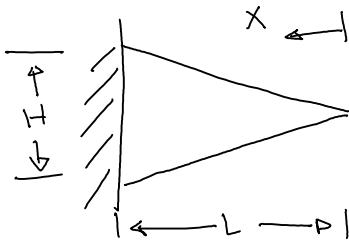
First Fundamental frequency

$$\omega_1 = 2.6575 \frac{H}{L^2} \sqrt{\frac{E}{3\varphi}}$$

where

E = Young's modulus

φ = material density

Source:

Dynamics of Vibrations

Enrico Volterra
E. C. Zachmanoglou
1965