

$$\varphi(0) = 0 = C_3 = 0$$

$$T(0) = 0 = C_1 = 0$$

$$V(\ell) = 0 \quad \frac{q\ell^4}{24EI} + \frac{C_2\ell^2}{2EI} + \frac{C_4}{EI} = 0$$

$$\varphi(\ell) = -\frac{q\ell^3}{6EI} = -\frac{q\ell^3}{6EI} - \frac{C_2\ell}{EI}$$

$$C_2 = \frac{q\ell^2}{16} - \frac{q\ell^2}{6} = -\frac{3q\ell^2 - 8q\ell^2}{48} = -\frac{5}{48}q\ell^2$$

$$C_4 = -\frac{q\ell^4}{24} + \frac{5}{48}q\ell^4 = \frac{3q\ell^4}{48}$$

$$V(z) = \frac{qz^4}{24EI} - \frac{5}{96EI}qz^2z^2 + \frac{3q\ell^4}{48EI}$$

$$\varphi(z) = -\frac{qz^3}{6EI} + \frac{5q\ell^2}{48EI}z$$

$$T(z) = -qz$$

$$M(z) = \frac{5}{48}q\ell^2z - \frac{qz^2}{2}$$

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