



$$R_A = \frac{qL}{4} + \frac{P}{2} \quad M_{max} = R_A \frac{L}{2} - q \frac{L}{4} \left(\frac{L}{4} + \frac{L}{8} \right)$$

$$= \frac{L \left(\frac{P}{2} + \frac{Lq}{4} \right)}{2} - \frac{3L^2 q}{32}$$

$$\sigma_a = 124 \text{ MPa} \quad L = 9.75 \text{ m}$$

$$P = 13 \text{ kN} \quad q = 6.6 \frac{\text{kN}}{\text{m}}$$

$$S_{reqd} = \frac{M_{max}}{\sigma_a} \quad S_{reqd} = \frac{L \left(\frac{P}{2} + \frac{Lq}{4} \right)}{2} - \frac{3L^2 q}{32} = 413.662 \text{ cm}^3$$

$$W = 41.9 \frac{\text{kg}}{\text{m}} \cdot g = 410.899 \frac{\text{N}}{\text{m}} \quad g = 9.8077 \frac{\text{m}}{\text{s}^2}$$

$$R_A = \frac{qL}{4} + \frac{P}{2} + \frac{WL}{2}$$

$$M_{max} = R_A \frac{L}{2} - q \frac{L}{4} \left(\frac{L}{4} + \frac{L}{8} \right) = W \frac{L}{2} \frac{L}{4} = 56.19 \text{ kN}\cdot\text{m}$$

$$S_{reqd} = 453.038 \text{ m}^3 > \text{IPN 260 不適用}$$

$$\text{IPN 280} \quad S = 542 \text{ m}^2 \quad W = 41.9 \frac{\text{kg}}{\text{m}} \cdot g = 469.739 \frac{\text{N}}{\text{m}}$$

$$R_A = \frac{qL}{4} + \frac{P}{2} + \frac{Wb}{2}$$

$$M_{max} = R_A \frac{L}{2} - q \frac{L}{4} \left(\frac{L}{4} + \frac{L}{8} \right)$$

$$= W \frac{L}{2} \frac{L}{4} = 56.876 \text{ kN}\cdot\text{m}$$

$$S_{reqd} = \frac{M_{max}}{\sigma_a} = 458.677 \text{ cm}^3 < \text{IPN 280}$$

選用 IPN 280