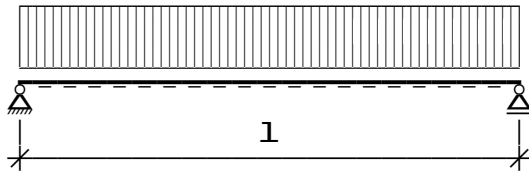


Berekening stalen ligger

Schema



De overspanning $l = 4,50$ m

Belastingen

$$q_{pb,rep} = 21,0 \text{ kN/m}$$

$$q_{vb,rep} = 4,3 \text{ kN/m}$$

$$q_d = 1,2 * q_{pb,rep} + 1,5 * q_{vb,rep} = 31,6 \text{ kN/m}$$

Maatgevende snedekrachten

$$M_{Ed} = \frac{1}{8} * q_d * l^2 = 80,0 \text{ kNm}$$

$$V_{Ed} = \frac{1}{2} * q_d * l = 71,1 \text{ kN}$$

Materiaal en profiel

Staal	=	S235
f_y	=	235 N/mm ²
Profieltype	=	HEB
Gekozen profiel	=	HEB 180
Weerstandsmoment W_{pl}	=	481 * 10 ³ mm ³
Traagheidsmoment I_y	=	3830 * 10 ⁴ mm ⁴
Afschuifoppervlak A_v	=	2029 mm ²
Elasticiteitsmodulus E	=	210000 N/mm ²

Buigsterkte (exclusief kip)

$$M_{c,Rd} = \frac{W_{pl} * f_y}{1,0} * 10^{-6} = 113 \text{ kNm}$$

Afschuifsterkte

$$V_{pl,Rd} = \frac{A_v * \frac{f_y}{\sqrt{3}}}{1,0} * 10^{-3} = 275 \text{ kN}$$

$$V_{c,Rd} = V_{pl,Rd} = 275 \text{ kN}$$

Toetsing

$$\text{Buiging } uc = \frac{M_{Ed}}{M_{c,Rd}} = \frac{80,0}{113} = 0,71 \leq 1,00$$

$$\text{Afschuiving } uc = \frac{V_{Ed}}{V_{c,Rd}} = \frac{71,1}{275} = 0,26 \leq 1,00$$

Vervormingen

$$l = l * 10^3 = 4500 \text{ mm}$$

$$u_{pb} = \frac{5}{384} * \frac{q_{pb,rep} * l^4}{E * I_y} = 13,9 \text{ mm}$$

$$u_{vb} = \frac{5}{384} * \frac{q_{vb,rep} * l^4}{E * I_y} = 2,9 \text{ mm}$$