

Quote No.

Customer :

Project : **Stock Item - 30x2mm Bearer Bar**

Specification

Elefantgrating 31x31 / 30x2SP 1000 x2000 mm 1 No
Approximate weight per panel = **47 Kgs**
Approximate free area of specification = **88 %**

Conditions

Continous support beam. See figure 1+2, 3+4.

Bearing bar centres **33.25 mm**
Maximum clear span L_s : **1100 mm**
Contact area (c x a) point load : **200 x 200 mm**
Maximum permissable deflection on 1/200 of L_s **5.50 mm**

Material parameters :

Bearing Bar &

Edge Bar Material equivalent to : **S235J2**

Finish : **Galvanised to BS EN 1461:2009**

All remaining material equivalent to : **S235J2**

Partial safety factors to **BS 4592:Part 0: 2006**

Yield strength F_y : **240 N/mm²**

Partial safety factor γ Material **1.00**

Modulus of elasticity E_0 : **210000 N/mm²**

Partial safety factor γ Load **1.60**

Partial safety factor γ Impact **1.00**

Examination of uniformly distributed load :

Load

$$M_{\max} = \frac{1}{8} \times q \times L_s^2 \times \gamma_{\text{Load}} \times \gamma_{\text{Impact}} = W_{\text{bars}} \times \left(\frac{1000}{c/c \text{ bars}} + 1 \right) \times \frac{f_y}{\gamma_{\text{material}}}$$

$$q = 5 \text{ kN/m}^2$$

Deflection

$$U_{\max} = \frac{5}{384} \times \frac{q \times L_s^4}{E \times \left(\left(\frac{1000}{c/c \text{ bars}} \right) + 1 \right) \times I}$$

Deflection at maximum loading: **3.25 mm**

Max. deflection based on criteria: **5.50 mm**

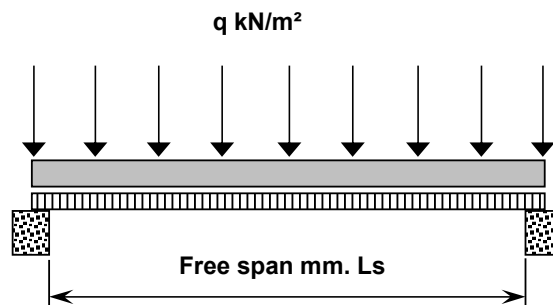


Figure 1. continuous support beam

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Calculation continues on page 2

Examination of pointload :

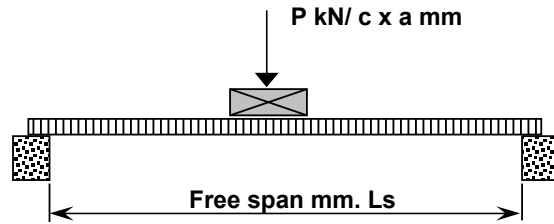


Figure 2. continuous support beam

Load

$$M_{\max} = \frac{1}{4} \times P \times \left(L_s - \frac{c}{2} \right) \times \gamma_{\text{Load}} \times \gamma_{\text{Impact}} = W_{\text{bars}} \times \left(\left(\frac{a}{c/c \text{ bars}} \right) + n \right) \times \frac{f_y}{\gamma_{\text{material}}}$$

n = 5 No (Additional bars affected)

$$P = 1500 \text{ N} = 1.5 \text{ kN}$$

Deflection

$$U_{\max} = \frac{1}{384} \times \frac{P \times (8 \times L_s^3 - 4 \times L_s \times c^2 + c^3)}{E \times \left(\left(\frac{a}{c/c \text{ bars}} \right) + n \right) \times I_{\text{bars}}}$$

Deflection at maximum loading: **3.76 mm**

Max. deflection based on criteria: **5.5 mm**

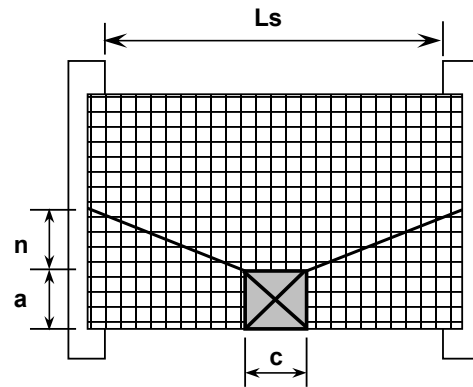


Figure 3.

Load

$$M_{\max} = \frac{1}{4} \times P \times \left(L_s - \frac{c}{2} \right) \times \gamma_{\text{Load}} \times \gamma_{\text{Impact}} = W_{\text{bars}} \times \left(\left(\frac{a}{c/c \text{ bars}} \right) + 2 \times n \right) \times \frac{f_y}{\gamma_{\text{material}}}$$

n = 5 No (Additional bars affected)

$$P = 1500 \text{ N} = 1.5 \text{ kN}$$

Deflection

$$U_{\max} = \frac{1}{384} \times \frac{P \times (8 \times L_s^3 - 4 \times L_s \times c^2 + c^3)}{E \times \left(\left(\frac{a}{c/c \text{ bars}} \right) + 2 \times n \right) \times I_{\text{bars}}}$$

Deflection at maximum loading: **2.70 mm**

Max. deflection based on criteria: **5.5 mm**

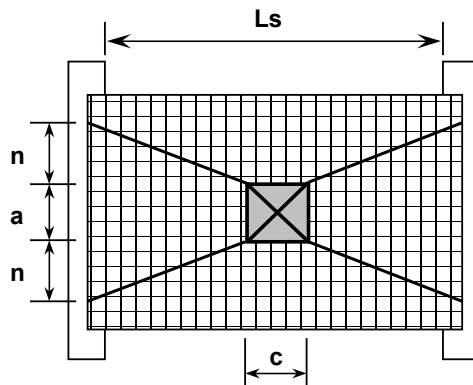


Figure 4.

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