CRANE BEAM

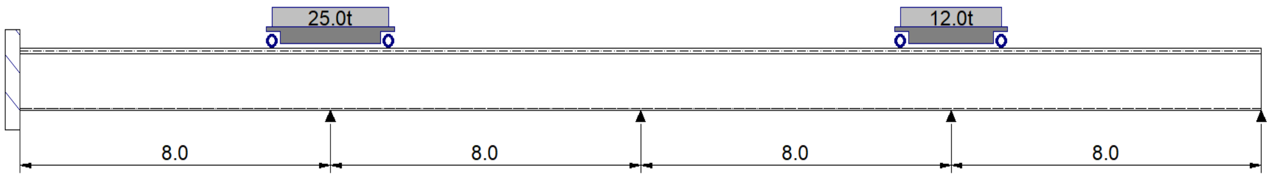
STEEL RUNWAY BEAMS FOR GANTRY CRANES
DESIGN | S05

Summary

Swiftly design and optimise multi-span crane gantry girders with one or two cranes. The program allows for continuously or simply supported girders.

Multiple combinations of main beams and capping beams, including standard I-sections, plate girders and box girders are all supported.

Crane Beam calculates the envelopes for all the required design forces (including vertical loads and horizontal effects of the moving cranes), moments and deflections.



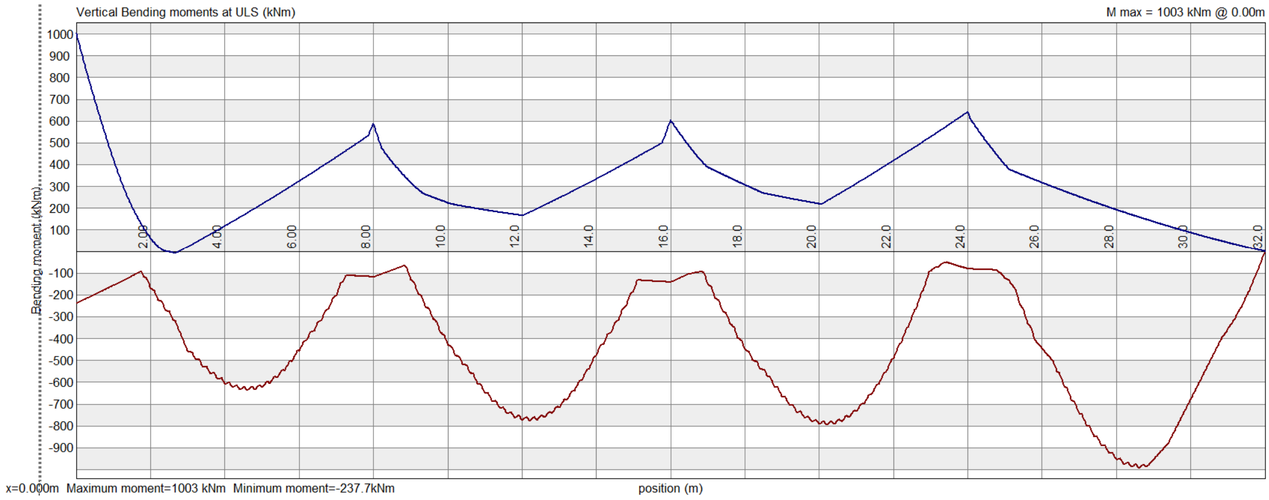
What makes this module special?

- Multi-span girders can be designed
- Two cranes can be used as design input
- Calculates force and moment envelopes
- Crabs can have up to four wheels

Detailed Description

Crane Beam is used to swiftly design and optimise multi-span crane gantry girders with one or two cranes. The program allows for continuously or simply supported girders to be designed. Multiple combinations of main beams and capping beams, including standard I-sections, plate girders and box girders are also supported.

Enveloped results for all axes are plotted.



The design procedure for crane gantry girders is similar to that used for statically loaded girders. The various loading codes recognise the varying degree of duty of different types of cranes and gives the parameters for horizontal transverse effects. Especially in the case of heavier duty cranes, certain aspects of the design and construction may require special consideration.

The design output includes deflection, bending moment, and shear force diagrams. Detailed calculations are published in Calcsheet, where all relevant design checks can be seen.

a) Cross-sectional strength

SANS 10162 - 2005 13.8.:

$$C_{zz} = \frac{C_u}{C_r} + \frac{0.85 \cdot M_{ux}}{M_{rx}} + \frac{0.6 \cdot M_{uy}}{M_{ry}}$$

$$= \frac{16.615}{10\ 062.410} + \frac{0.85 \times 1\ 002.667}{2\ 408.776} + \frac{0.6 \times 0.000}{247.180}$$

$$= 0.355$$

OK

b) Lateral torsional buckling strength

$$L_{tbc} = \frac{C_u}{C_r} + \frac{0.85 \cdot U_{1x} \cdot M_{ux}}{M_{rx}} + \frac{0.6 \cdot U_{1y} \cdot M_{uy}}{M_{ry}}$$

$$= \frac{16.615}{10\ 062.410} + \frac{0.85 \times 1 \times 1\ 002.667}{2\ 154.228} + \frac{0.6 \times 1 \times 0.000}{247.180}$$

$$= 0.397$$

OK

c) Additional check for class 1 I sections

$$L_{tbc} = \frac{M_{ux}}{M_{rx}} + \frac{M_{uy}}{M_{ry}}$$

$$= \frac{1\ 002.667}{2\ 154.228} + \frac{0.000}{247.180}$$

$$= 0.465$$

OK

Supported Codes

Design Codes

- BS 5950 – 1990
- BS 5950 – 2000
- CAN / CSA-S16.1-94
- Eurocode 3 - 2005
- SABS 0162 - 1984
- SABS 0162 - 1993
- SANS 10162 – 2005
- SANS 10162-1: 2011

Loading Codes

- SABS 0160 – 1989
- Eurocode 1 – 2004
- SANS 10160 – 2009