



Beam Moments Formulas

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List of 24 Beam Moments Formulas

Beam Moments 🗗

1) Bending Moment of Cantilever Beam Subjected to UDL at Any Point from Free End 🕑

 $M = \left(\frac{w \cdot x^2}{2}\right)$ $M = \left(\frac{(w \cdot x^2)}{2}\right)$ $S7.0037kN*m = \left(\frac{67.46kN/m \cdot (1300mm)^2}{2}\right)$ $S7.0037kN*m = \left(\frac{w \cdot L \cdot x}{2}\right) - \left(w \cdot \frac{x^2}{2}\right)$ $M = \left(\frac{w \cdot L \cdot x}{2}\right) - \left(w \cdot \frac{x^2}{2}\right)$ $S7.0037kN*m = \left(\frac{67.46kN/m \cdot 2600mm \cdot 1300mm}{2}\right) - \left(67.46kN/m \cdot \frac{(1300mm)^2}{2}\right)$ $S7.0037kN*m = \left(\frac{67.46kN/m \cdot 2600mm \cdot 1300mm}{2}\right) - \left(67.46kN/m \cdot \frac{(1300mm)^2}{2}\right)$ $S7.0037kN*m = \left(\frac{67.46kN/m \cdot 2600mm \cdot 1300mm}{2}\right) - \left(67.46kN/m \cdot \frac{(1300mm)^2}{2}\right)$ $S7.0037kN*m = \left(\frac{67.46kN/m \cdot 2600mm \cdot 1300mm}{2}\right) - \left(\frac{67.46kN/m \cdot (1300mm)^2}{2}\right)$

$$fx M = \left(\frac{P \cdot x}{2}\right)$$

$$ex 57.2kN*m = \left(\frac{88kN \cdot 1300mm}{2}\right)$$



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4) Fixed End Moment at Left Support Carrying Right Angled Triangular Load at Right Angled End A

$$f \times FEM = \frac{q \cdot (L^2)}{20}$$

$$f \times FEM = \frac{13kN/m \cdot ((2600mm)^2)}{20}$$

$$f \times 4.394kN^*m = \frac{13kN/m \cdot ((2600mm)^2)}{20}$$

$$f \times Fixed End Moment at Left Support with Couple at Distance A C
$$f \times FEM = \frac{M_c \cdot b \cdot (2 \cdot a - b)}{L^2}$$

$$f \times 18.26368kN^*m = \frac{85kN^*m \cdot 350mm \cdot (2 \cdot 2250mm - 350mm)}{(2600mm)^2}$$

$$f \times Fixed End Moment at Left Support with Point Load at Contain Distance from Left$$$$

6) Fixed End Moment at Left Support with Point Load at Certain Distance from Left Support

$$\mathbf{FEM} = \left(\frac{\mathbf{P} \cdot (\mathbf{b}^2) \cdot \mathbf{a}}{\mathbf{L}^2}\right)$$

$$\mathbf{EX} 3.588018 \text{kN*m} = \left(\frac{88 \text{kN} \cdot ((350 \text{mm})^2) \cdot 2250 \text{mm}}{(2600 \text{mm})^2}\right)$$

7) Fixed End Moment of Fixed Beam Carrying Three Equi-spaced Point Loads 🖸

fx
$$FEM = \frac{15 \cdot P \cdot L}{48}$$

ex $71.5 kN^*m = \frac{15 \cdot 88 kN \cdot 2600 mm}{48}$



Open Calculator 🗗

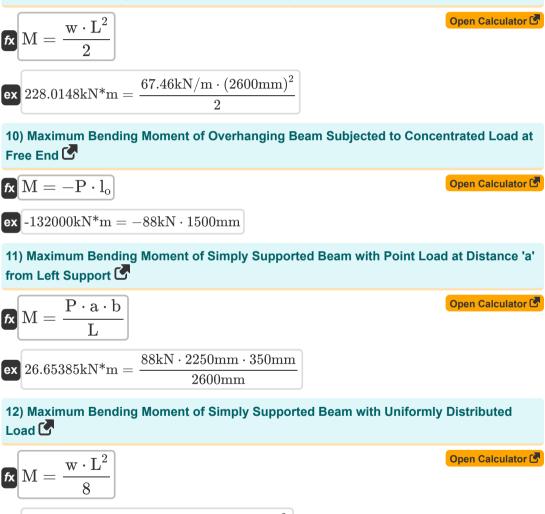
8) Maximum Bending Moment of Cantilever Beam Subjected to Point Load at Free End 💪

fx
$$\mathbf{M} = \mathbf{P} \cdot \mathbf{L}$$

Open Calculator 🗹

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ex 228.8kN*m = 88kN · 2600mm
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9) Maximum Bending Moment of Cantilever Subject to UDL over Entire Span 🕑









13) Maximum Bending Moment of Simply Supported Beams with Point Load at Centre 🕑

fx
$$M = \frac{P \cdot L}{4}$$

ex 57.2 kN*m $= \frac{88$ kN $\cdot 2600$ mm}{4}

14) Maximum Bending Moment of Simply Supported Beams with Uniformly Varying Load

fx
$$\mathrm{M}=rac{\mathrm{q}\cdot\mathrm{L}^2}{9\cdot\sqrt{3}}$$

e

$$5.637505 \text{kN*m} = \frac{13 \text{kN/m} \cdot (2600 \text{mm})^2}{9 \cdot \sqrt{3}}$$

15) Moment on Fixed End of Fixed Beam carrying Two Equi Spaced Point Loads 🖸



16) Moment on Fixed End of Fixed Beam Carrying Uniform Varying Load

$$fx FEM = \frac{5 \cdot q \cdot (L^2)}{96}$$

$$ex 4.577083kN^*m = \frac{5 \cdot 13kN/m \cdot ((2600mm)^2)}{96}$$





Open Calculator

Open Calculator

17) Moment on Fixed End of Fixed Beam having Point Load at Center 🚰

fx
$$FEM = \frac{P \cdot L}{8}$$

ex $28.6 kN^*m = \frac{88 kN \cdot 2600 mm}{8}$

18) Moment on Fixed End of Fixed Beam having UDL over Entire Length 🕑

$$fx FEM = \frac{w \cdot (L^2)}{12}$$

$$ex 38.00247 kN^*m = \frac{67.46 kN/m \cdot ((2600 mm)^2)}{12}$$

Curved Beams 🗹

19) Bending Moment when Stress is Applied at Point in Curved Beam 🚰

$$fx M = \left(\frac{S \cdot A \cdot R}{1 + \left(\frac{y}{Z \cdot (R+y)}\right)}\right)$$
ex 57kN*m = $\left(\frac{33.25MPa \cdot 0.04m^2 \cdot 50mm}{1 + \left(\frac{25mm}{2.0 \cdot (50mm+25mm)}\right)}\right)$

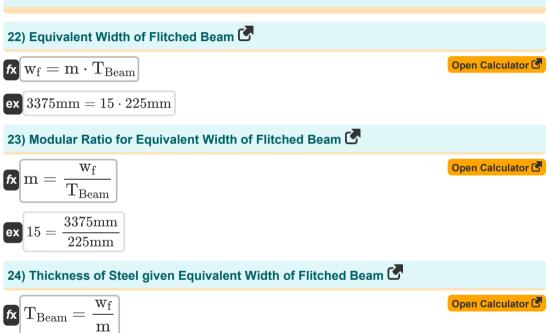
20) Cross-Sectional Area when Stress is Applied at Point in Curved Beam 🕑



Open Calculator 🛃

21) Stress at Point for Curved Beam as defined in Winkler-Bach Theory 🖒

Flitched Beam 🕑



 $ex 225mm = \frac{3375mm}{15}$





Variables Used

- a Distance from Support A (Millimeter)
- A Cross Sectional Area (Square Meter)
- **b** Distance from Support B (Millimeter)
- FEM Fixed End Moment (Kilonewton Meter)
- L Length of Beam (Millimeter)
- Io Length of Overhang (Millimeter)
- **m** Modular Ratio
- M Bending Moment (Kilonewton Meter)
- M_c Moment of Couple (Kilonewton Meter)
- P Point Load (Kilonewton)
- **q** Uniformly Varying Load (Kilonewton per Meter)
- R Radius of Centroidal Axis (Millimeter)
- S Stress (Megapascal)
- TBeam Beam Thickness (Millimeter)
- W Load per Unit Length (Kilonewton per Meter)
- Wf Equivalent Width of Flitched Beam (Millimeter)
- X Distance x from Support (Millimeter)
- **y** Distance from Neutral Axis (Millimeter)
- Z Cross-Section Property





Constants, Functions, Measurements used

- Function: **sqrt**, sqrt(Number) Square root function
- Measurement: Length in Millimeter (mm) Length Unit Conversion
- Measurement: Area in Square Meter (m²) Area Unit Conversion
- Measurement: Force in Kilonewton (kN) Force Unit Conversion
- Measurement: Surface Tension in Kilonewton per Meter (kN/m) Surface Tension Unit Conversion
- Measurement: Moment of Force in Kilonewton Meter (kN*m) Moment of Force Unit Conversion
- Measurement: Stress in Megapascal (MPa) Stress Unit Conversion



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Check other formula lists

- Mohr's Circle of Stresses Formulas
- Beam Moments Formulas C
- Bending Stress Formulas C
- Combined Axial and Bending Loads
 Formulas
- Elastic Stability of Columns Formulas G
- Principal Stress Formulas C
- Slope and Deflection Formulas C
- Strain Energy Formulas C

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