calculatoratoz.com

unitsconverters.com

Composite Construction in Buildings Formulas

Calculators! Examples! Conversions!

Bookmark **calculatoratoz.com**, **unitsconverters.com**

Widest Coverage of Calculators and Growing - **30,000+ Calculators!**
Calculate With a Different Unit for Each Variable - **In built Unit Conversion!**
Widest Collection of Measurements and Units - **250+ Measurements!**

Feel free to SHARE this document with your friends!

Please leave your feedback here...

List of 13 Composite Construction in Buildings Formulas

Composite Construction in Buildings

1) Allowable Stress in Flanges

Open Calculator

fx $F_p = 0.66 \cdot F_y$

ex $165\text{MPa} = 0.66 \cdot 250\text{MPa}$

2) Dead Load Moment given Maximum Steel Stress as per AISC Specifications

Open Calculator

fx $M_D = (\sigma_{max} \cdot S_s) - M_L$

ex $212\text{N*mm} = (2.18\text{N/mm}^2 \cdot 150\text{mm}^3) - 115\text{N*mm}$

3) Dead Load Moment Given Maximum Stress in Bottom Flange

Open Calculator

fx $M_D = (\sigma_{max} \cdot S_{tr}) - M_L$

ex $430\text{N*mm} = (2.18\text{N/mm}^2 \cdot 250\text{mm}^3) - 115\text{N*mm}$

4) Dead Load Moment given Maximum Unit Stress in Steel

Open Calculator

fx $$M_D = \left(\sigma_{max} - \left(\frac{M_L}{S_{tr}}\right)\right) \cdot S_s$$

ex $$258N*mm = \left(2.18N/mm^2 - \left(\frac{115N*mm}{250mm^3}\right)\right) \cdot 150mm^3$$

5) Live Load Moment given Maximum Steel Stress as per AISC Specifications

Open Calculator

fx $$M_L = (\sigma_{max} \cdot S_s) - M_D$$

ex $$47N*mm = (2.18N/mm^2 \cdot 150mm^3) - 280N*mm$$

6) Live Load Moment given Maximum Stress in Bottom Flange

Open Calculator

fx $$M_L = (\sigma_{max} \cdot S_{tr}) - M_D$$

ex $$265N*mm = (2.18N/mm^2 \cdot 250mm^3) - 280N*mm$$

7) Live Load Moment given Maximum Unit Stress in Steel

Open Calculator

fx $$M_L = \left(\sigma_{max} - \left(\frac{M_D}{S_s}\right)\right) \cdot S_{tr}$$

ex $$78.33333N*mm = \left(2.18N/mm^2 - \left(\frac{280N*mm}{150mm^3}\right)\right) \cdot 250mm^3$$

8) Maximum Steel Stress as per AISC Specifications

Open Calculator

fx $$\sigma_{max} = \frac{M_D + M_L}{S_s}$$

ex $$2.633333\text{N/mm}^2 = \frac{280\text{N*mm} + 115\text{N*mm}}{150\text{mm}^3}$$

9) Maximum Stress in Bottom Flange

Open Calculator

fx $$\sigma_{max} = \frac{M_D + M_L}{S_{tr}}$$

ex $$1.58\text{N/mm}^2 = \frac{280\text{N*mm} + 115\text{N*mm}}{250\text{mm}^3}$$

10) Maximum Unit Stress in Steel

Open Calculator

fx $$\sigma_{max} = \left(\frac{M_D}{S_s}\right) + \left(\frac{M_L}{S_{tr}}\right)$$

ex $$2.326667\text{N/mm}^2 = \left(\frac{280\text{N*mm}}{150\text{mm}^3}\right) + \left(\frac{115\text{N*mm}}{250\text{mm}^3}\right)$$

11) Section Modulus of Steel Beam given Maximum Steel Stress as per AISC Specifications

Open Calculator

$$S_s = \frac{M_D + M_L}{\sigma_{max}}$$

$$181.1927\text{mm}^3 = \frac{280\text{N*mm} + 115\text{N*mm}}{2.18\text{N/mm}^2}$$

12) Section Modulus of Transformed Composite Section given Maximum Stress in Bottom Flange

Open Calculator

$$S_{tr} = \frac{M_D + M_L}{\sigma_{max}}$$

$$181.1927\text{mm}^3 = \frac{280\text{N*mm} + 115\text{N*mm}}{2.18\text{N/mm}^2}$$

13) Yield Strength given Allowable Stress in Flange

Open Calculator

$$F_y = \frac{F_p}{0.66}$$

$$250\text{MPa} = \frac{165\text{MPa}}{0.66}$$

Variables Used

- F_p Allowable Bearing Stress *(Megapascal)*
- F_y Yield Stress of Steel *(Megapascal)*
- M_D Dead Load Moment *(Newton Millimeter)*
- M_L Live Load Moment *(Newton Millimeter)*
- S_s Section Modulus of Steel Beam *(Cubic Millimeter)*
- S_{tr} Section Modulus of Transformed Section *(Cubic Millimeter)*
- σ_{max} Maximum Stress *(Newton per Square Millimeter)*

Constants, Functions, Measurements used

- Measurement: **Volume** in Cubic Millimeter (mm^3)
  Volume Unit Conversion
- Measurement: **Pressure** in Megapascal (MPa)
  Pressure Unit Conversion
- Measurement: **Torque** in Newton Millimeter (N*mm)
  Torque Unit Conversion
- Measurement: **Stress** in Megapascal (MPa), Newton per Square Millimeter (N/mm^2)
  Stress Unit Conversion

Check other formula lists

- **Allowable-Stress Design Formulas**
- **Base and Bearing Plates Formulas**
- **Cold Formed or Light Weighted Steel Structures Formulas**
- **Composite Construction in Buildings Formulas**
- **Design of Stiffeners under Loads Formulas**
- **Webs under Concentrated Loads Formulas**

Feel free to SHARE this document with your friends!

PDF Available in

English Spanish French German Russian Italian Portuguese Polish Dutch

3/21/2024 | 7:43:23 AM UTC

Please leave your feedback here...