



## **Braking Torque Formulas**

Calculators!

Examples!

Conversions!

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### **List of 12 Braking Torque Formulas**

### **Braking Torque**

1) Braking Torque for Band and Block Brake, Considering Thickness of Band

fx  $M_{
m t} = (T_1 - T_2) \cdot r_{
m e}$ 

Open Calculator

2) Braking Torque for Band and Block Brake, Neglecting Thickness of Band

fx  $M_{
m t} = (T_1 - T_2) \cdot r_{
m d}$ 

Open Calculator

 $(720N - 500N) \cdot 0.16m$ 

3) Braking Torque for Double Block or Shoe Brake

fx  $M_{\mathrm{t}} = (F_{\mathrm{t}1} + F_{\mathrm{t}2}) \cdot r_{\mathrm{w}}$ 

Open Calculator

 $= 37.8N*m = (8N + 12N) \cdot 1.89m$ 

4) Braking Torque for Pivoted Block or Shoe Brake

fx  $M_{t}=\mu^{'}\cdot R_{n}\cdot r_{w}$ 

Open Calculator

 $4.536N*m = 0.4 \cdot 6N \cdot 1.89m$ 





### 5) Braking Torque for Shoe Brake

fx  $M_{
m t} = F_{
m t} \cdot r_{
m w}$ 

Open Calculator 🚰

- $28.35N*m = 15N \cdot 1.89m$
- 6) Braking Torque for Shoe Brake given Force Applied at End of Lever
- $\mathbf{M}_{\mathrm{t}} = rac{\mu_{\mathrm{b}} \cdot P \cdot l \cdot r_{\mathrm{w}}}{x}$

Open Calculator

- 7) Braking Torque for Shoe Brake if Line of Action of Tangential Force Passes above Fulcrum Anti Clock
- $\mathbf{M}_{\mathrm{t}} = rac{\mu_{\mathrm{b}} \cdot \mathrm{r_{\mathrm{w}}} \cdot \mathrm{P} \cdot \mathrm{l}}{\mathrm{x} + \mu_{\mathrm{b}} \cdot \mathrm{a_{\mathrm{s}}}}$

Open Calculator 🗗

- $= 1.870265 N^*m = \frac{0.35 \cdot 1.89 m \cdot 16 N \cdot 1.1 m}{5m + 0.35 \cdot 3.5 m}$
- 8) Braking Torque of Shoe Brake if Line of Action of Tangential Force Passes above Fulcrum Clockwise
- $\mathbf{M}_{\mathrm{t}} = rac{\mu_{\mathrm{b}} \cdot \mathbf{r}_{\mathrm{w}} \cdot \mathbf{P} \cdot \mathbf{l}}{\mathbf{x} \mu_{\mathrm{b}} \cdot \mathbf{a}_{\mathrm{s}}}$

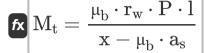
Open Calculator 🗗

$$= 3.084079 \text{N*m} = \frac{0.35 \cdot 1.89 \text{m} \cdot 16 \text{N} \cdot 1.1 \text{m}}{5 \text{m} - 0.35 \cdot 3.5 \text{m}}$$





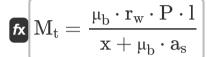
## 9) Braking Torque of Shoe Brake if Line of Action of Tangential Force Passes below Fulcrum Anti Clock



Open Calculator

 $= \frac{3.084079\text{N*m} = \frac{0.35 \cdot 1.89\text{m} \cdot 16\text{N} \cdot 1.1\text{m}}{5\text{m} - 0.35 \cdot 3.5\text{m}}$ 

# 10) Braking Torque of Shoe Brake if Line of Action of Tangential Force Passes below Fulcrum Clockwise



Open Calculator

 $= 1.870265 N*m = \frac{0.35 \cdot 1.89 m \cdot 16 N \cdot 1.1 m}{5m + 0.35 \cdot 3.5 m}$ 

# 11) Braking Torque on Drum for Simple Band Brake Considering Band Thickness

fx  $M_{
m t} = (T_1 - T_2) \cdot r_{
m e}$ 

Open Calculator 🗗

# 12) Braking Torque on Drum for Simple Band Brake, Neglecting Thickness of Band

fx 
$$M_{
m t} = (T_1 - T_2) \cdot r_{
m d}$$

Open Calculator





#### Variables Used

- µ Equivalent Coefficient of Friction
- as Shift in Line of Action of Tangential Force (Meter)
- **F**<sub>t</sub> Tangential Braking Force (Newton)
- F<sub>11</sub> Braking Forces on The Block 1 (Newton)
- F<sub>12</sub> Braking Forces on The Block 2 (Newton)
- I Distance Between Fulcrum And End of Lever (Meter)
- Mt Braking or Fixing Torque on Fixed Member (Newton Meter)
- P Force Applied at The End of The Lever (Newton)
- r<sub>d</sub> Radius of The Drum (Meter)
- re Effective Radius of The Drum (Meter)
- R<sub>n</sub> Normal Force Pressing The Brake Block on The Wheel (Newton)
- r<sub>w</sub> Radius of Wheel (Meter)
- T<sub>1</sub> Tension in Tight Side of The Band (Newton)
- T<sub>2</sub> Tension in The Slack Side of Band (Newton)
- X Distance Between Fulcrum And Axis of Wheel (Meter)
- µ<sub>b</sub> Coefficient of Friction For Brake



### Constants, Functions, Measurements used

- Measurement: Length in Meter (m)

  Length Unit Conversion
- Measurement: Force in Newton (N)
  Force Unit Conversion
- Measurement: Torque in Newton Meter (N\*m)
   Torque Unit Conversion





#### **Check other formula lists**

- Braking Torque Formulas
- Dynamometer Formulas
- Force Formulas

- Retardation of the Vehicle Formulas
- Total Normal Reaction
   Formulas

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