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Braking Torque Formulas

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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 $M_t = (T_1 - T_2) \cdot r_e$

Open Calculator 🔗

ex $3.3N*m = (720N - 500N) \cdot 0.015m$

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

fx $M_t = (T_1 - T_2) \cdot r_d$

Open Calculator 🔗

ex $35.2N*m = (720N - 500N) \cdot 0.16m$

3) Braking Torque for Double Block or Shoe Brake 🔗

fx $M_t = (F_{t1} + F_{t2}) \cdot r_w$

Open Calculator 🔗

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

4) Braking Torque for Pivoted Block or Shoe Brake 🔗

fx $M_t = \mu' \cdot R_n \cdot r_w$

Open Calculator 🔗

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

5) Braking Torque for Shoe Brake ⤴

Open Calculator ⤴

fx $M_t = F_t \cdot r_w$

ex $28.35 \text{N*m} = 15\text{N} \cdot 1.89\text{m}$

6) Braking Torque for Shoe Brake given Force Applied at End of Lever ⤴

Open Calculator ⤴

fx $M_t = \dfrac{\mu_b \cdot P \cdot l \cdot r_w}{x}$

ex $2.32848 \text{N*m} = \dfrac{0.35 \cdot 16\text{N} \cdot 1.1\text{m} \cdot 1.89\text{m}}{5\text{m}}$

7) Braking Torque for Shoe Brake if Line of Action of Tangential Force Passes above Fulcrum Anti Clock ⤴

Open Calculator ⤴

fx $M_t = \dfrac{\mu_b \cdot r_w \cdot P \cdot l}{x + \mu_b \cdot a_s}$

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

8) Braking Torque of Shoe Brake if Line of Action of Tangential Force Passes above Fulcrum Clockwise ⤴

Open Calculator ⤴

fx $M_t = \dfrac{\mu_b \cdot r_w \cdot P \cdot l}{x - \mu_b \cdot a_s}$

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

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

Open Calculator 🔗

$$fx \quad M_t = \frac{\mu_b \cdot r_w \cdot P \cdot l}{x - \mu_b \cdot a_s}$$

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

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

Open Calculator 🔗

$$fx \quad M_t = \frac{\mu_b \cdot r_w \cdot P \cdot l}{x + \mu_b \cdot a_s}$$

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

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

Open Calculator 🔗

$$fx \quad M_t = (T_1 - T_2) \cdot r_e$$

$$ex \quad 3.3 N*m = (720N - 500N) \cdot 0.015m$$

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

Open Calculator 🔗

$$fx \quad M_t = (T_1 - T_2) \cdot r_d$$

$$ex \quad 35.2 N*m = (720N - 500N) \cdot 0.16m$$

Variables Used

- $\mu^{'}$ Equivalent Coefficient of Friction
- a_s Shift in Line of Action of Tangential Force *(Meter)*
- F_t Tangential Braking Force *(Newton)*
- F_{t1} Braking Forces on The Block 1 *(Newton)*
- F_{t2} Braking Forces on The Block 2 *(Newton)*
- l Distance Between Fulcrum And End of Lever *(Meter)*
- M_t Braking or Fixing Torque on Fixed Member *(Newton Meter)*
- P Force Applied at The End of The Lever *(Newton)*
- r_d Radius of The Drum *(Meter)*
- r_e Effective Radius of The Drum *(Meter)*
- R_n Normal Force Pressing The Brake Block on The Wheel *(Newton)*
- r_w Radius of Wheel *(Meter)*
- T_1 Tension in Tight Side of The Band *(Newton)*
- T_2 Tension in The Slack Side of Band *(Newton)*
- x Distance Between Fulcrum And Axis of Wheel *(Meter)*
- μ_b 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

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