



Scraper Production Formulas

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Examples!

Conversions!

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List of 25 Scraper Production Formulas

Scraper Production 🕑

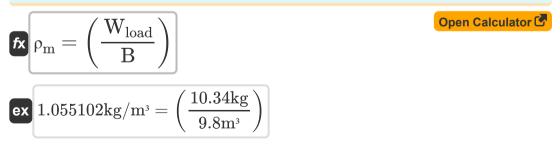
1) Bank or Quantity of Scrap Produced 🕑

fx
$$B = \left(rac{W_{load}}{
ho_m}
ight)$$
 ex $9.4 {
m m}^3 = \left(rac{10.34 {
m kg}}{1.1 {
m kg/m}^3}
ight)$

2) Cycle Time given Trips per Hour for Excavating Scrap

fx
$$C_{t}=\left(rac{W_{T}}{f}
ight)$$
 ex $5.7\mathrm{h}=\left(rac{22.8}{4\mathrm{rev}/\mathrm{h}}
ight)$

3) Density of Material given Quantity of Scrap Produced 💪







Open Calculator

Open Calculator

4) Haul Distance in Feet given Variable Time
$$\checkmark$$

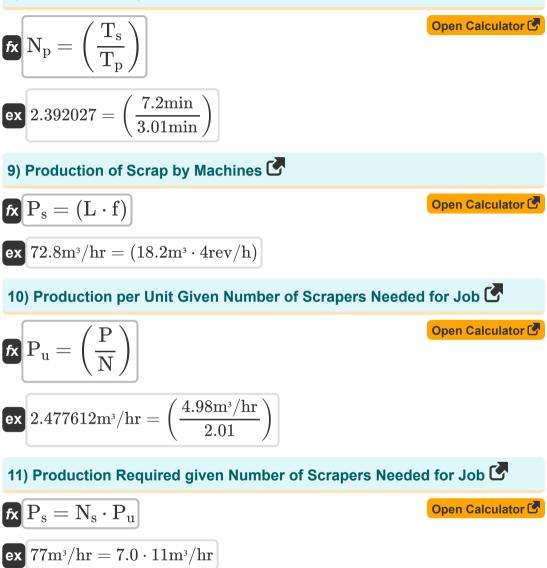
fx $H_{ft} = (T_v \cdot 88 \cdot S_{mph}) - R_{ft}$ Open Calculator \bigstar
ex $66.396ft = (0.2min \cdot 88 \cdot 0.045mi/h) - 3.3ft$
5) Haul Distance in Meter given Variable Time \checkmark
fx $h_m = (T_v \cdot 16.7 \cdot S_{kmph}) - R_{meter}$ Open Calculator \circlearrowright
fx $h_m = (T_v \cdot 16.7 \cdot S_{kmph}) - R_{meter}$ Open Calculator \circlearrowright
fx $6.804333m = (0.2min \cdot 16.7 \cdot 0.149km/h) - 1.49m$
6) Load Given Production of Scrap by Machines \checkmark
fx $L = \left(\frac{P_s}{f}\right)$ Open Calculator \circlearrowright
fx $18.75m^3 = \left(\frac{75.00m^3/hr}{4rev/h}\right)$
7) Number of Scrapers Needed for Job \checkmark
fx $N = \left(\frac{P_s}{P_u}\right)$ Open Calculator \circlearrowright
fx $N = \left(\frac{P_s}{P_u}\right)$





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8) Number of Scrapers Pusher can Load 🕑





12) Production Required to Determine Number of Scrapers

$$\begin{array}{l} \text{P}_{s} = \left(\frac{B_{sp}}{t_{hr}} \right) \\ \text{ex} \end{tabular} 73.01587 \mathrm{m}^{\mathrm{s}}/\mathrm{hr} = \left(\frac{184 \mathrm{m}^{\mathrm{s}}}{2.52 \mathrm{h}} \right) \\ \text{13) Pusher Cycle Time given Number of Scrapers Pusher can Load } \\ \text{fx} \end{tabular} \end{tabular} \mathbf{T}_{\mathrm{p}} = \left(\frac{\mathrm{T}_{\mathrm{s}}}{\mathrm{N}_{\mathrm{p}}} \right) \\ \text{ex} \end{tabular} 0.6 \mathrm{min} = \left(\frac{7.2 \mathrm{min}}{12} \right) \end{array}$$

14) Quantity given Production Required 🕑

$$\label{eq:Bsp} \begin{array}{l} \mbox{Open Calculator} \end{tabular} \end{tabular} \label{eq:Bsp} \left\{ B_{sp} = \left(P_s \cdot t_{hr} \right) \right\} & \mbox{Open Calculator} \end{tabular} \\ \end{tabular} \end{ta$$





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16) Return Distance in Meter given Variable Time 🖸

$$\mathbf{x} \left[\mathrm{R}_{\mathrm{meter}} = \left(\mathrm{T}_{\mathrm{v}} \cdot 16.7 \cdot \mathrm{S}_{\mathrm{kmph}}
ight) - \mathrm{h}_{\mathrm{m}}
ight]$$

$$imes 1.894333 {
m m} = (0.2 {
m min} \cdot 16.7 \cdot 0.149 {
m km/h}) - 6.40 {
m m}$$

17) Scraper Cycle Time given Number of Scrapers Pusher can Load 🕑

fx
$$\mathrm{T_s} = (\mathrm{N_p} \cdot \mathrm{T_p})$$

$$\begin{array}{c|c} \textbf{ax} & 36.12 \text{min} = (12 \cdot 3.01 \text{min}) \end{array}$$

18) Speed at Haul and Return in Kilometer per Hour given Variable Time

fx
$$\mathbf{S}_{\mathrm{kmph}} = rac{\mathrm{h}_{\mathrm{m}} + \mathrm{R}_{\mathrm{meter}}}{16.7 \cdot \mathrm{T}_{\mathrm{v}}}$$

Open Calculator 🕑

Open Calculator

ex
$$0.141737 \mathrm{km/h} = rac{6.40 \mathrm{m} + 1.49 \mathrm{m}}{16.7 \cdot 0.2 \mathrm{min}}$$

19) Speed at Haul and Return in Miles per Hour given Variable Time

fx
$$\mathrm{S_{mph}}=rac{\mathrm{H_{ft}}+\mathrm{R_{ft}}}{88 \cdot \mathrm{T_{v}}}$$

$${f ex} \left[{0.045338{
m mi}/{
m h}} = rac{{66.92{
m ft} + 3.3{
m ft}}}{{88 \cdot 0.2{
m min}}}
ight.$$

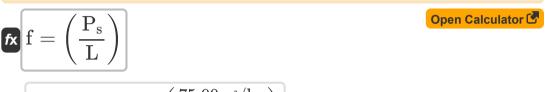
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Open Calculator

Open Calculator

20) Trips per Hour for Excavating Scrap 🕑





ex
$$4.120879 \text{rev}/\text{h} = \left(rac{75.00 \text{m}^3/\text{hr}}{18.2 \text{m}^3}
ight)$$

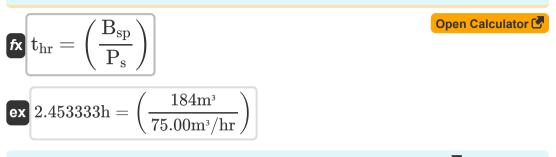
22) Variable Time when Haul and Return Distance is in Feet 🕑

$$\label{eq:relation} \begin{split} & \text{Open Calculator } \textbf{C} \\ & \text{fx} \quad T_v = \frac{H_{ft} + R_{ft}}{88 \cdot S_{mph}} \\ & \text{ex} \quad 0.201504 \text{min} = \frac{66.92 \text{ft} + 3.3 \text{ft}}{88 \cdot 0.045 \text{mi/h}} \\ & \text{calculator } \textbf{C} \\ & \text{fx} \quad W_{load} = (B \cdot \rho_m) \\ & \text{ex} \quad 10.78 \text{kg} = (9.8 \text{m}^3 \cdot 1.1 \text{kg/m}^3) \\ \end{split}$$





24) Working Time given Production Required 🕑



25) Working Time given Trips per Hour for Excavating Scrap 🕑

fx
$$W_{T} = (f \cdot C_{t})$$

ex $24 = (4 rev/h \cdot 6h)$



Variables Used

- **B** Bank in Scraper (Cubic Meter)
- **B**_{sp} Bank in Scraper Production (*Cubic Meter*)
- Ct Cycle Time (Hour)
- **f** Trips per Hour (*Revolution per Hour*)
- H_{ft} Haul Distance in Feet (Foot)
- **h**_m Haul Distance (Meter)
- L Load in Scraper Production (Cubic Meter)
- N Number of Scraper
- N_p Number of Scraper a Pusher
- N_s Number of Scraper in Scraper Production
- **P** Production Required (Cubic Meter per Hour)
- **P**_s Production Required in Scraper Production (*Cubic Meter per Hour*)
- **P**_u Production per Unit (*Cubic Meter per Hour*)
- R_{ft} Return Distance in Foot in Scraper Production (Foot)
- Rmeter Return Distance in Meter (Meter)
- Skmph Speed in Kmph in Scraper Production (Kilometer per Hour)
- Smph Speed in Miles per Hour in Scraper Production (Mile per Hour)
- **t_{hr}** Time in Scraper Production in Hour (Hour)
- T_p Pusher Cycle Time (*Minute*)
- T_s Scraper Cycle Time (Minute)
- **T_v** Variable Time in Scraper Production (*Minute*)



- Wload Weight of Load Scrap (Kilogram)
- W_T Working Time in Scraper Production
- ρ_m Density of Material in Scraper Production (*Kilogram per Cubic Meter*)

Constants, Functions, Measurements used

- Measurement: Length in Foot (ft), Meter (m) Length Unit Conversion
- Measurement: Weight in Kilogram (kg) Weight Unit Conversion
- Measurement: Time in Hour (h), Minute (min) Time Unit Conversion
- Measurement: Volume in Cubic Meter (m³) Volume Unit Conversion
- Measurement: Speed in Mile per Hour (mi/h), Kilometer per Hour (km/h)
 Speed Unit Conversion
- Measurement: Frequency in Revolution per Hour (rev/h)
 Frequency Unit Conversion
- Measurement: Volumetric Flow Rate in Cubic Meter per Hour (m³/hr) Volumetric Flow Rate Unit Conversion
- Measurement: Density in Kilogram per Cubic Meter (kg/m³) Density Unit Conversion



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