Gear Interaction

\[ \phi_C = f(\phi_B) \]

\[ \phi_B = \phi_A + \phi_{AB} \]

\[ \phi_D = \phi_C + \phi_{CD} \]
The diagram shows a mechanical problem involving a force and moment. The problem is solved using the equations:

\[ M_{x-\text{axis}} = 0 \]

\[ 1000 - F(0.040) = 0 \]

\[ F = 25000 \text{ N} \]

\[ M_{x-\text{axis}} = 0 \]

\[ T_A - 25000(1.100) = 0 \]

\[ T_A = 2500 \text{ N-m} \]

\[ T_B = \frac{F}{0.040} \quad T_C = 2.5T_C \]

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\[ T_{\text{big}} = F \frac{r_{\text{big}}}{r_{\text{big}}} \]
\[ T_{\text{big}} = F \frac{r_{\text{big}}}{r_{\text{little}}} \quad \text{or} \quad T_{\text{little}} = \frac{r_{\text{little}}}{r_{\text{big}}} T_{\text{big}} \]

\[ T_{\text{little}} = F \frac{r_{\text{little}}}{r_{\text{little}}} \]

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Big Gear \( r_{\text{big}} \) Little Gear \( r_{\text{little}} \)

\[
\phi_{\text{big}} \cdot r_{\text{big}} = \phi_{\text{little}} \cdot r_{\text{little}}
\]

\[
\phi_{\text{big}} = \frac{r_{\text{little}}}{r_{\text{big}}} \cdot \phi_{\text{little}} \quad \text{or} \quad \phi_{\text{little}} = \frac{r_{\text{big}}}{r_{\text{little}}} \cdot \phi_{\text{big}}
\]