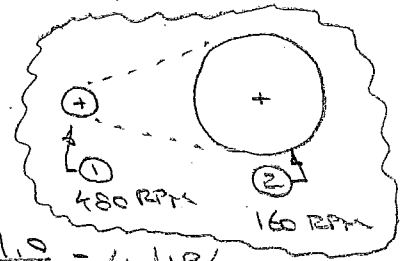


MECH 153 - CHAIN EXAMPLE (CORRECTED)

- DRIVER: 10 hp, 480 RPM, ELECTRIC MOTOR
WITH 1.68" ϕ SHAFT, LIGHT SERVICE.
- DRIVEN: LINE-SHAFT RUNNING AT 160 RPM
WITH 1.75" ϕ SHAFT.
- MOTOR AND LINE SHAFT: PARALLEL (ON SAME PLANE).
- CENTRE-TO-CENTRE DISTANCE: 48-60 INCHES.
- USE A TRIPLE CHAIN



- ① TABLE 20-7 \rightarrow SERVICE FACTOR = 1.0
STRAND FACTOR = 2.5

$$\text{REQD HP} = \frac{\text{HP} \times \text{SERVICE FACTOR}}{\text{STRAND FACTOR}} = \frac{10 \times 1.0}{2.5} = 4 \text{ HP/STRAND.}$$

- ② TABLE 20-16 \rightarrow SELECT CHAIN NO. 40 (0.5" PITCH).
(SIZE AS THOUGH YOU HAD 1 CHAIN AT 4 hp).

- ③ TABLE 20-10 \rightarrow 0.5" PITCH \rightarrow 480 RPM IS ABOUT
HALF WAY BETWEEN 400 & 600
so $\frac{(3.33 \text{ hp} + 4.79 \text{ hp})}{2} = 4.045 \text{ hp.}$
Thus $N_{\text{small}} = 23 \text{ TEETH} = N_1$

- ④ TABLE 20-12 \rightarrow 0.5" PITCH $\rightarrow N_{\text{small}} = 23 \rightarrow$ MAX. BORE = 2.09"
2.09" > 1.68" \therefore SO FAR SO GOOD.

- ⑤ TABLE 20-13 $\rightarrow \frac{n_1}{n_2} = \frac{D_2}{D_1} = \frac{N_2}{N_1}$; N = # OF TEETH.

$$\text{so } N_2 = N_1 \left(\frac{n_1}{n_2} \right) = 23 \left(\frac{480}{160} \right) = 69 \approx 70 = N_2$$

$$\left[\text{ACTUAL } n_2 = n_1 \left(\frac{N_1}{N_2} \right) = 480 \left(\frac{23}{70} \right) = 157.7 \text{ RPM OK.} \right]$$

- ⑥ CHAIN LENGTH IN PITCHES = $2C + \frac{K}{2} + \frac{S}{2}$

$$C = \frac{(48+60)}{2} \div 0.5 = 108, \quad K = N_1 + N_2 = 23 + 70 = 93$$

$$\text{AVERAGE PITCH.} \quad F = N_2 - N_1 = 70 - 23 = 47 \rightarrow S = 55.95 \text{ (TABLE 20-6)}$$

$$\text{so } 2(108) + \frac{93}{2} + \frac{55.95}{108} = 263.01 \text{ PITCHES} = \underline{264 \text{ PITCHES}} \text{ (CLOSEST EVEN NO.)}$$

- ⑦ CHAIN LENGTH IN INCHES = NO. PITCHES \times PITCH = $264 \times 0.5 = 132''$