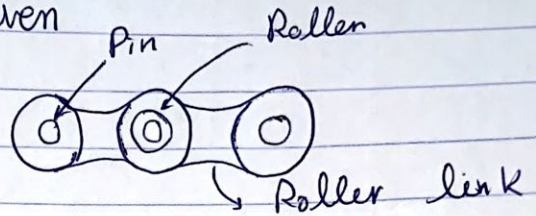


Chains

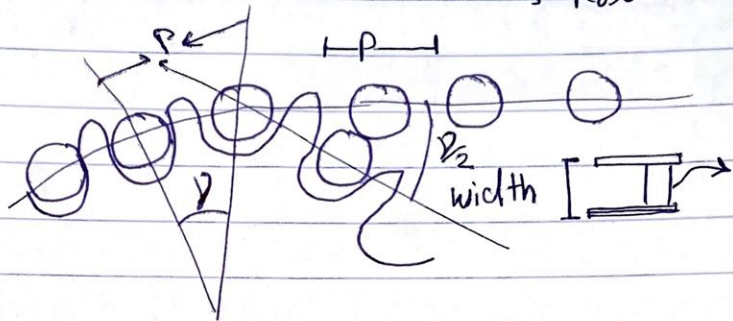
Pitch number is always even

ANSI chains

from Table 17-14



Not a smooth movement
 $\frac{V}{2}$ in Roller J
~~speed variation~~
 speed variation



γ : pitch angle
 P: Chain pitch

$\frac{\gamma}{2}$: Angle of articulation

$$\sin \gamma = \frac{P}{D/2}$$

$$\sin \frac{\gamma}{2} = \frac{P/2}{D/2}$$

$$\gamma = \frac{360}{N}$$

N: no of sprocket teeth

$$D = \frac{P}{\sin(180/N)}$$

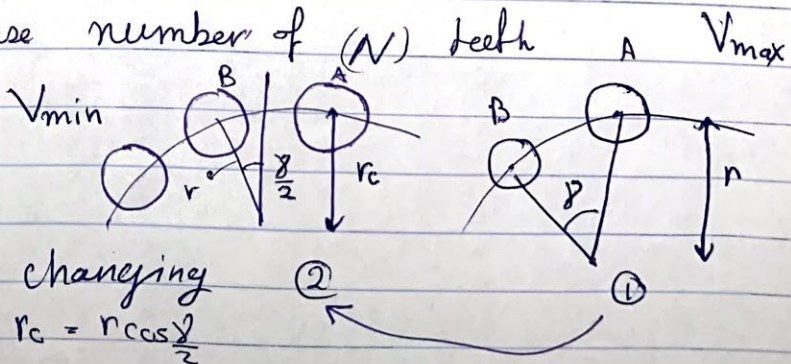
only one force exists

Note: Rotating of $\frac{\gamma}{2}$ causes wear in chain joints, impact between rollers and sprocket

to reduce it, increase number of (N) teeth

Chordal Action
 Distance between
 B, A and center
 from r to r_c

is changing
 $r_c = r \cos \frac{\gamma}{2}$



$$V_{\max} = \omega r$$

$$V_{\min} = \omega r_c$$

To reduce effect:-

$$\Delta r = r \left[1 - \cos \frac{\gamma}{2} \right] \quad \downarrow \text{ when } N \uparrow$$

$$N = \frac{2r}{p} \quad \text{Table 17-21}$$

Chain Velocity

$$V_{\max} (\text{at } D) = \frac{\pi D n}{12} = \frac{\pi n P}{12 \sin \left(\frac{180}{N} \right)}$$

$$V_{\min} (\text{at } d_c) = \frac{\pi d_c n}{12} = \frac{\pi n P \cos \frac{\gamma}{2}}{12 \sin \frac{180}{N}}$$

$$\Delta V = \frac{V_{\max} - V_{\min}}{V_{\text{av}}}$$

$$V_{\text{av}} = \frac{n P N}{12}$$

$$\frac{\Delta V}{V_{\text{av}}} = \frac{\pi}{N} \left[\frac{1}{\sin(180/N)} - \frac{1}{\tan(180/N)} \right]$$

N_1 : number of teeth for small sprocket

N_2 : " " " " " large "

$$V_p = \frac{N_2}{N_1} = 6 \text{ or less } \quad (\text{more life for chain})$$

• Min N is 17 \rightarrow less, life will \downarrow

Tables 17-20, 17-21 * for 17 teeth, life 15 kh at various speeds, single strand

Given $H = K_1 K_2 \frac{H_p}{K_s}$

H_p → $H_{tabulated}$ From tables
 K_1 → teeth number factor
 K_2 → K_s

K_1 From table 17-22 Pre extreme, كوب, Post-extreme
 K_2 " " 17-23 (1-single) أكثر من واحد أكثر

$H_{all} = K_m H_{nom}$

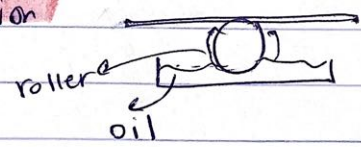
Chain length

$\frac{L}{P} = \frac{2C}{P} + \frac{N_1 + N_2}{2} + \frac{(N_2 - N_1)^2}{4PT^2 (C/P)}$

C → center distance
 P → Pitch
 $C < 80P$

→ Table 17-19

lubrication



lubrication cause continuity for rollers