

Section-3

2. Law of gearing: Law of gearing states that the common normal to the tooth profile at the point of contact should always pass through a fixed point called the pitch point in order to obtain a constant velocity ratio.

gear tooth failure: There are two basic modes of gear tooth failure:

Breakage of tooth due to static and dynamic load.

Surface destruction:

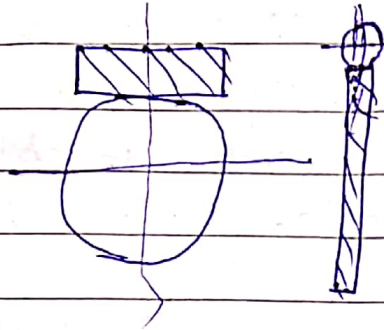
- a) abrasive wear
- b) corrosive wear
- c) pitting and
- d) scoring.

c) selection of gear material:

- 1) types of service
- 2) degree of desired accuracy
- 3) Required dimension and weight of the drive
- 4) Peripheral speed
- 5) method of manufacturing
- 6) Allowable stress
- 7) wear resistance

Section 5

1. Schematic diagram is



force acting upon worm gear.

- ① Tangential force on the worm: The tangential force (W_T) on the worm produces a twisting moment of magnitude ($W_T \times P_w/2$) and bends the worm in the horizontal plane

$$W_T = \frac{2 \times \text{Torque on worm}}{\text{Pitch circle dia of worm } (D_w)}$$

= Axial force or thrust on the worm gear

- ② Axial force or thrust on the worm: The axial force on worm,

$$W_A = W_T / \tan \alpha = \text{tangential force on the worm gear}$$

$$= \frac{2 \times \text{Torque on worm gear}}{\text{Pitch circle diameter of worm gear } (D_g)}$$

Radial or separating force on the worm's

The radial or separating force tends to force the worm gear out of mesh. This force also bends the worm in the vertical plane

$$W_R = W_a \tan \phi = \text{Radial or separating force on the worm gear}$$

efficiency of worm gears:

$$\eta = \frac{\tan \lambda (\cos \phi - \mu \tan \lambda)}{\cos \phi \tan \lambda + \mu}$$

- ϕ = Normal pressure angle
- μ = coefficient of friction.
- λ = Lead angle

Maximum efficiency when

$$\tan \lambda = \sqrt{\mu^2 + 1} - \mu$$

Normal Pitch: it is distance measured along the normal to the threads between two corresponding points on two adjacent threads of worm normal Pitch.

$$P_n = P_g \cos \lambda$$

Helix angle :- It is measured in a plane containing the axis of the worm and is equal to one-half thread profile angle.

It is angle between the tangent to the thread helix on the pitch cylinder and the axis of the worm. It is denoted by α_w

The worm helix angle is the complement of worm lead angle.

$$\alpha_w + \gamma = 90^\circ$$