GEAR TERMINOLOGY

Back lash = $t_2 - t_1$

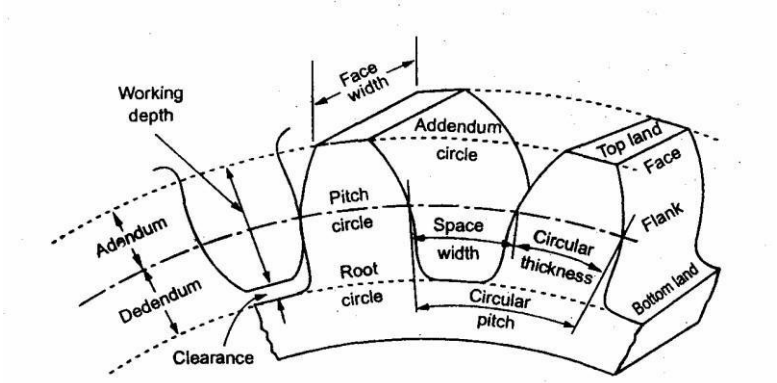


Fig 3.15 Gear Profile

1. Tooth profile

   It is the shape of any side of gear tooth in its cross section.

2. Base circle

   It is the circle of gear from which the involute profile is derived. Base circle diameter Pitch circle diameter x Cosine of pressure angle of gear

3. Pitch circle diameter (PCD)

   The diameter of a circle which will produce the same motion as the toothed gear wheel.

4. Pitch circle

   It is the imaginary circle of gear that rolls without slipping over the circle of its matiug gear.

5. Addendum circle

   The circle coincides with the crests (or) tops of teeth.

6. Dedendum circle (or) Root circle

This circle coincides with the roots (or) bottom on teeth.

7. Pressure angle (a)

It is the angle making by the line of action with the common tangent to the pitch circles of mating gears.

8. Module(m)

It is the ratio of pitch circle diameter to the total number of teeth. Where,

d = Pitch circle diameter. n = Number f teeth.

9. Circular pitch

It is the distance along the pitch circle between corresponding points of adjacent teeth.

10. Addendum

Radial distance between tip circle and pitch circle. Addendum value = 1 module.

11 Dedendum

Radial distance between itch circle and root circle,

Dedendum value = 1 .25module.

12. Clearance (C)

Amount of distance made by the tip of one gear with the root of mating gear.

Clearance = Difference between Dedendum and addendum values.

13. Blank diameter:

The diameter of the blank from which gear is out. Blank diameter = PCD + 2m

14. Face:

Part of the tooth in the axial plane lying between tip circle and pitch circle.

15. Flank:

Part of the tooth lying between pitch circle and root circle.

16. Top land:

Top surface of a tooth.

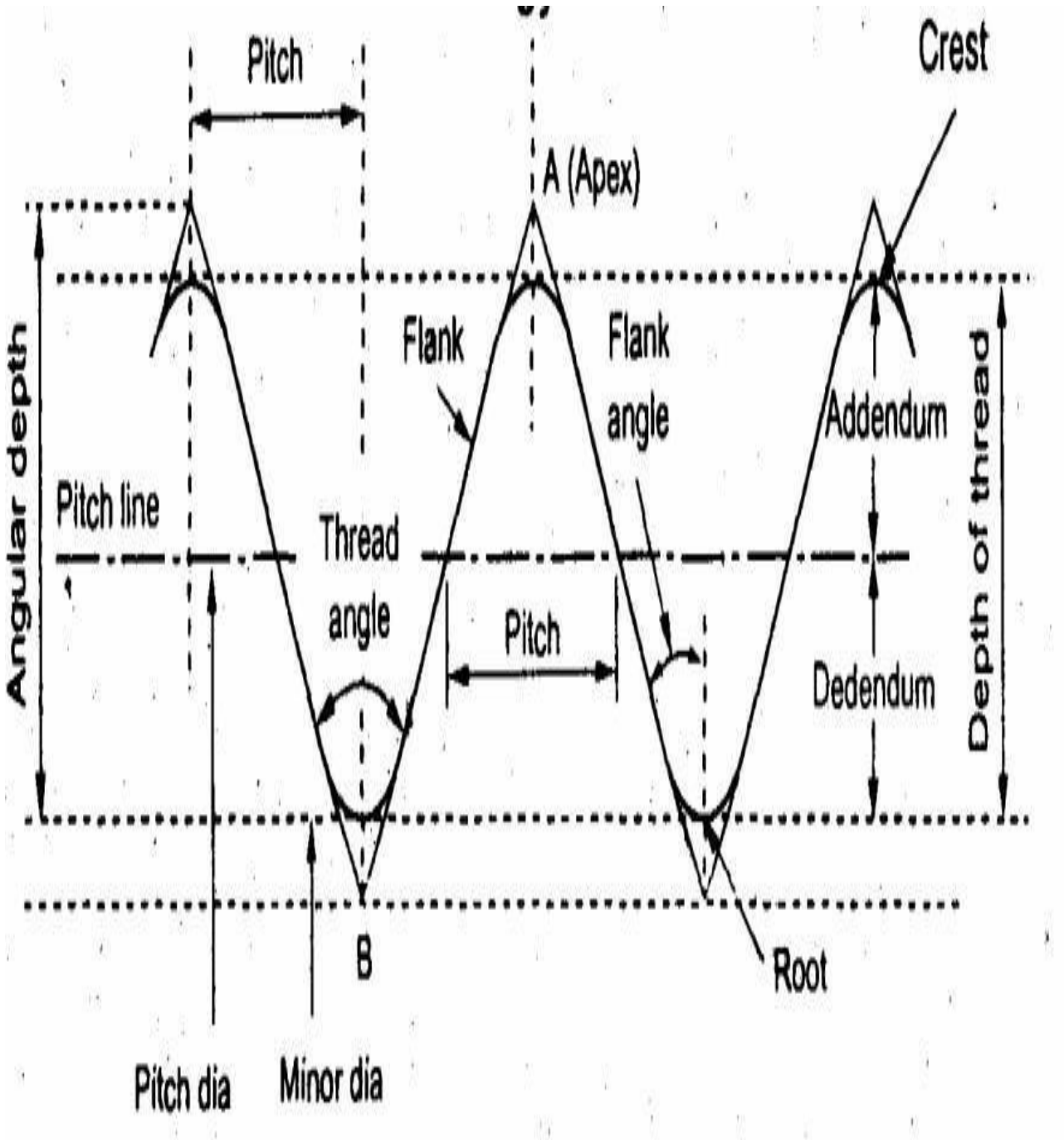
17. Lead angle

The angle between the tangent to the helix and plane perpendicular to the axis of cylinder.

Gear errors

1. Profile error: - The maximum distance of any point on the tooth profile form to the design profile.
2. Pitch error: - Difference between actual and design pitch
3. Cyclic error: - Error occurs in each revolution of gear
4. Run out: - Total range of reading of a fixed indicator with the contact points applied to a surface rotated, without axial movement, about a fixed axis.
5. Eccentricity: - Half the radial run out
6. Wobble: - Run out measured parallel to. the axis of rotation at a specified distance from the axis
7. Radial run out: - Run out measured along a perpendicular to the axis of rotation.
8. Undulation: - Periodical departure of the actual tooth surface from the design surface.
9. Axial run out: - Run out measured parallel to the axis of rotation at a speed.
10. Periodic error: -Error occurring at regular intervals.

Screw Thread Terminology



- **Pitch**

  It is the distance measured parallel to the screw threads axis between the corresponding points on two adjacent threads in the same axial plane. The basic pitch is equal to the lead divided by the number of thread starts.

- **Minor diameter:**

  It is the diameter of an imaginary co-axial cylinder which touches the roots of external threads.

- **Major diameter:**

  It is the diameter of an imaginary co-axial cylinder which touches the crests of an external thread and the root of an internal thread.

- **Lead:**

  The axial distance advanced by the screw in one revolution is the lead.

- **Pitch diameter:**

  It is the diameter at which the thread space and width are equal to half of the screw thread

- **Helix angle:**

  It is the angle made by the helix of the thread at the pitch line with the axis. The angle is measured in an axial plane.

- **Flank angle:**

  It is the angle between the flank and a line normal to the axis passing through the apex of the thread.

- **Height of thread:**

  It is the distance measured radially between the major and minor diameters respectively

- **Addendum:**

  Radial distance between the major and pitch cylinders for external thread. Radial distance between the minor and pitch cylinder for internal thread.

- **Dedendum:**

  It is the radial distance between the pitch and minor cylinders for external thread. Also radial distance between the major and pitch cylinders for internal thread.

Error in Thread

The errors in screw thread may arise during the manufacturing or storage of threads. The errors either may cause in following six main elements in the thread.

1) Major diameter error
2) Minor diameter error
3) Effective diameter error
4) Pitch error
5) Flank angles error
6) Crest and root error

1) Major diameter error

It may cause reduction in the flank contact and interference with the matching threads.

2) Minor diameter error

It may cause interference, reduction of flank contact.

3)Effective Error

If the effective diameter is small the threads will be thin on the external screw and thick on an internal screw.

3) Pitch errors

If error in pitch, the total length of thread engaged will be either too high or too small.

The various pitch errors may classified into

1. Progressive error
2. Periodic error
3. Drunken error
4. Irregular error