5.4 DESIGN OF DAMPER WINDING

- Damper windings are provided in the pole faces of salient pole alternators. Damper windings are nothing but the copper or aluminum bars housed in the slots of the pole faces.
- The ends of the damper bars are short circuited at the ends by short circuiting rings similar to end rings as in the case of squirrel cage rotors.
- These damper windings are serving the function of providing mechanical balance; provide damping effect, reduce the effect of over voltages and damp out hunting in case of alternators.
- In case of synchronous motors they act as rotor bars and help in self-starting of the motor.

Design Procedure:

- MMF of Damper Winding = $0.143\ ac\ \tau$

  Where,

  ac – specific electrical loading

  τ- Pole pitch

- Total area of damper winding $A_d = 0.2\ ac\ \tau\ /\delta_d$

  Where,

  ac – specific electrical loading

  τ- Pole pitch

  δ_d - Current density

- Cross-sectional area of each damper winding $a_d = A_d/N_d$

  Where,

  A_d – Total area of damper winding

  N_d - Number of damper bars

- Number of damper bars $N_d = \frac{\text{Pole arc}}{0.8 * \text{Stator slot pitch}}$
- Diameter of each damper bar $D_d = \sqrt{\frac{4ad}{\pi}}$
- Length of each damper bar $L_d = 1.1\ L$

Where,

L – Length of core.

Height of pole shoe $h_s = 2\ D_d$

Where,

D_d – Diameter of each damper bar.