

5.6 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 $D_d = \sqrt{\frac{4a_d}{\pi}}$

- 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.

