Chapter-9

(Hysteresis loss & Eddy Current loss)

Lecture-2

What are Eddy Current loss?

- **Eddy current losses are the result of Farady's law, which states that, *"Any change in the environment of a coil of wire will cause a voltage to be induced in the coil, regardless of how the magnetic change is produced."* Thus, when a motor core is rotated in a magnetic field, a voltage, or EMF, is induced in the coils. This induced EMF causes circulating currents to flow, referred to as eddy currents. The power loss caused by these currents is known as eddy current loss.**
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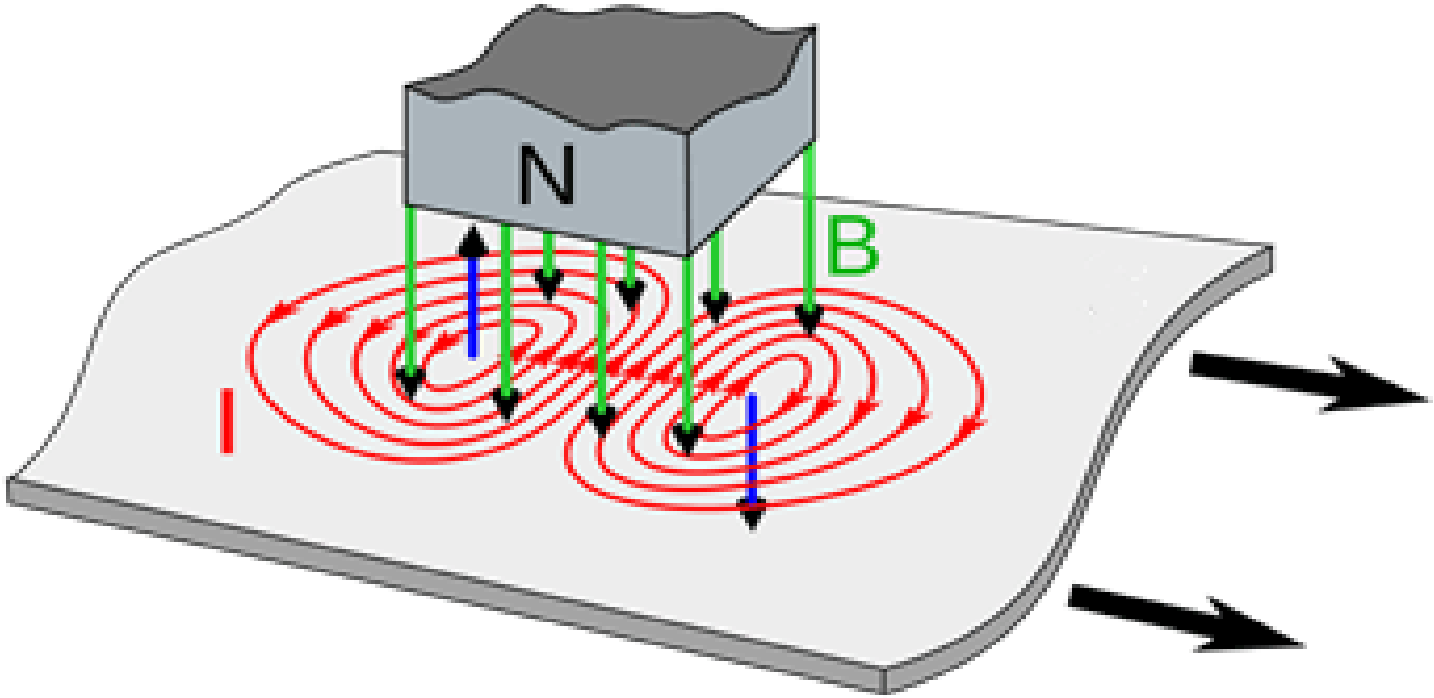
- Motors armature cores use many, thin pieces of iron (referred to as “laminations”), rather than a single piece, because the resistance of individual pieces is higher than the resistance of one, solid piece. This higher resistance (due to smaller area per piece) reduces eddy currents, and in turn, eddy current losses. The laminations are insulated from each other with a lacquer coating to prevent the eddy currents from “jumping” from one lamination to another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- **The equation for eddy current loss is given as:**

- **Pe = Ke * Bmax2 * f2 * t2 * V**

- **Pe = eddy current loss (W)**

- **Ke = eddy current constant**

- **B = flux density (Wb/m2)**

- **f = frequency of magnetic reversals per second (Hz)**

- **t = material thickness (m)**

- **V = volume (m3)**

- **Magnetic losses are so named because they depend on the magnetic paths in the motor, but they are also referred to as “core losses” and “iron loss**