SNS COLLEGE OF ENGINEERING

Kurumbapalayam (Po), Coimbatore – 641 107

An Autonomous Institution

Accredited by NBA – AICTE and Accredited by NAAC – UGC with 'A' Grade
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DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

UNIT 5 – OTHER MOTORS

LINEAR INDUCTION MOTOR

CONTENTS

- Introduction
- Construction
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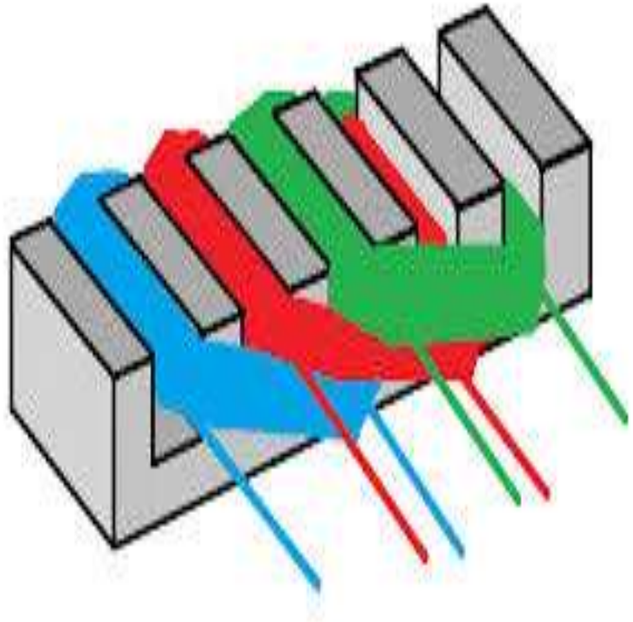
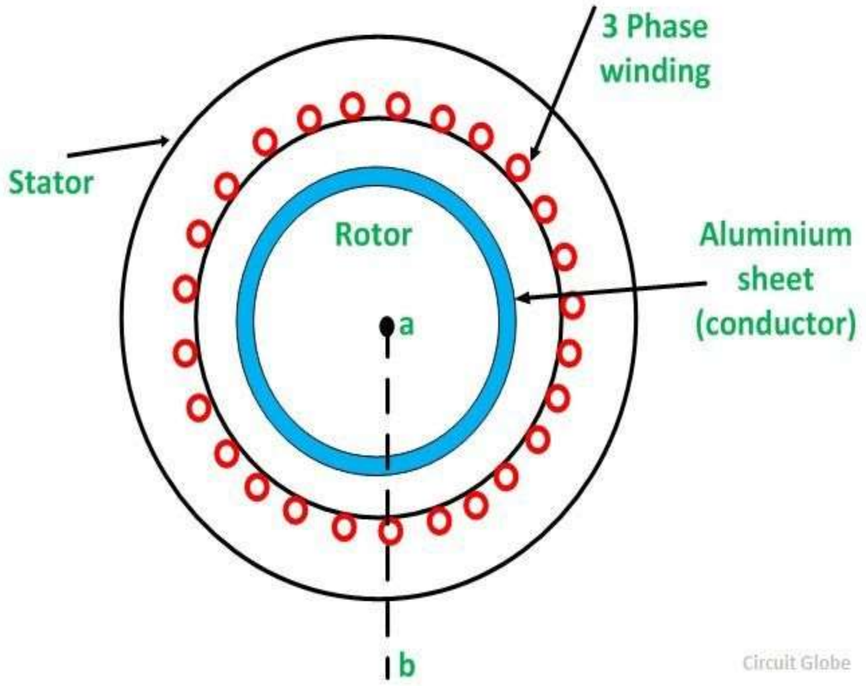
LINEAR INDUCTION MOTOR

- A **Linear Induction Motor (LIM)** is a type of electric motor that produces linear, straight-line motion instead of rotational motion like conventional motors.
- It operates on the principles of electromagnetic induction, creating thrust along its length by generating a moving magnetic field.
- This unique design makes LIMs particularly valuable in applications requiring direct linear motion, such as in maglev trains, conveyor systems, and amusement rides.
- Unlike traditional motors with rotating components, LIMs have fewer moving parts, which allows for simpler construction, low maintenance, and smooth operation, making them ideal for efficient, high-speed transportation and industrial systems.



CONSTRUCTION

- The construction of a **Linear Induction Motor (LIM)** consists of two main components: the primary (stator) and the secondary (rotor).
- The primary part, or stator, has laminated iron cores with copper or aluminum windings. When AC flows through these windings, it generates a moving magnetic field along the motor's length.
- The secondary part, typically a flat conductive sheet made of aluminum or copper, may include a back iron to enhance magnetic efficiency.
- An air gap separates the primary and secondary, allowing the magnetic field to induce currents in the secondary. This interaction generates thrust, producing linear motion along the length of the motor.



WORKING

- The working of a Linear Induction Motor (LIM) is based on the principles of electromagnetic induction. When an alternating current (AC) passes through the windings of the primary (stator), it creates a moving magnetic field along the motor's length.
- This moving magnetic field induces eddy currents in the secondary (rotor), which is typically a conductive plate made of aluminum or copper. These eddy currents generate their own magnetic field, which interacts with the original field from the stator.
- The resulting force propels the secondary in a straight line, creating the linear motion characteristic of LIMs. The speed and direction of this linear motion can be controlled by adjusting the frequency and phase of the input AC power, allowing LIMs to be highly efficient for direct linear applications such as transportation and conveyor systems.

ADVANTAGES AND DISADVANTAGES

ADVANTAGES

- Reliable Performance
- Precise Control
- Direct Linear Motion
- Low Maintance
- Smooth Operation

DISADVANTAGES

- Limited Speed Range
- Low Efficiency
- High Power Consumption
- Complex Control System
- High Cost

APPLICATON

Maglev Trains

LIMs are the primary propulsion system in magnetic levitation trains, allowing for high-speed travel without contact with the tracks, resulting in reduced friction and noise

Roller Coaster

Many thrill rides use LIMs for rapid acceleration and deceleration, providing a smooth and exhilarating experience for riders.

Elevators

LIM technology can enhance the efficiency and speed of elevator systems, particularly in high-rise buildings.


Thank you