

# APPLICATION OF DC MOTOR

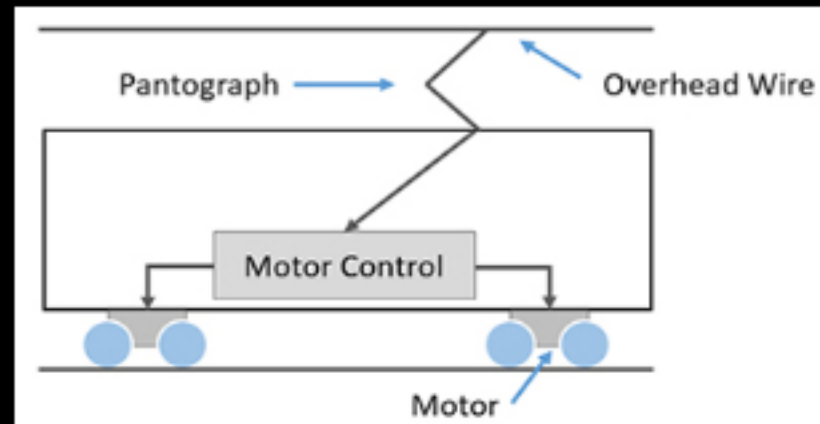
The application of different dc motor are following

## 1. DC Series Motor

- Characteristics: High starting torque, variable speed, not suitable for no-load.
- Applications:
  - ◆ Electric locomotives and traction systems
  - ◆ Cranes, hoists, conveyors
  - ◆ Elevators and lifts
  - ◆ Air compressors



Electric locomotives



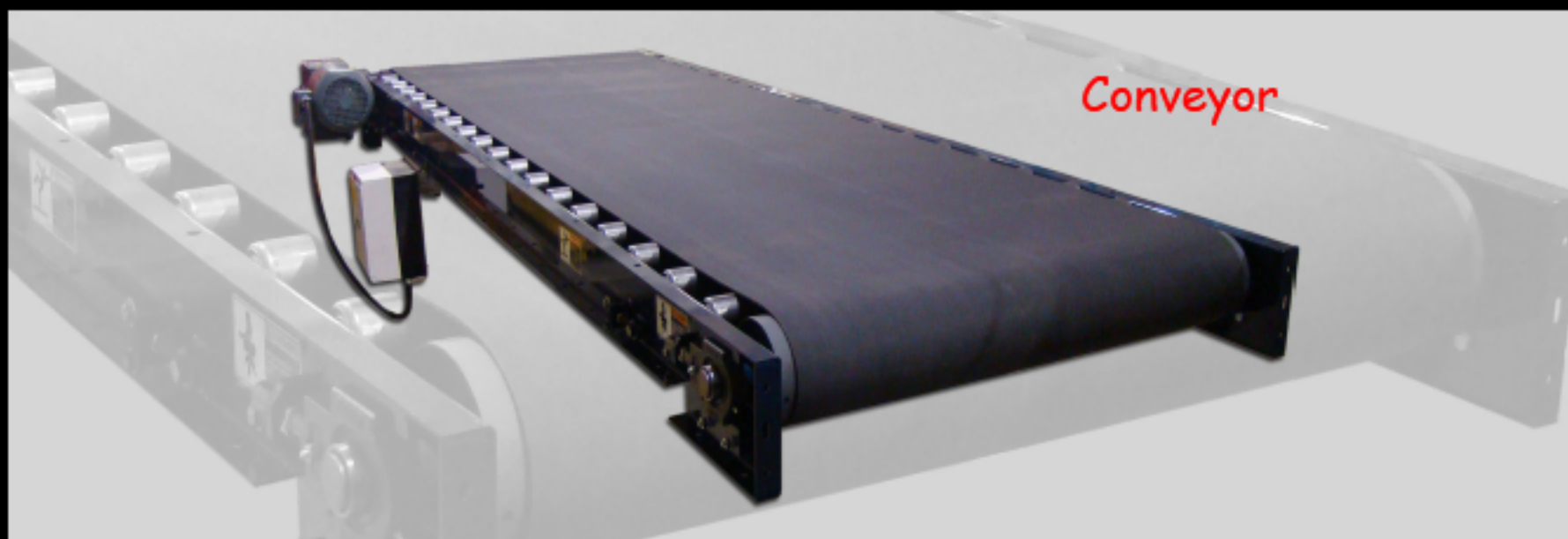
Traction systems



Cranes



Hoists





## 2. DC Shunt Motor

- Characteristics: Nearly constant speed, good speed regulation.
- Applications:
  - ◆ Lathes, milling machines, drilling machines
  - ◆ Fans, blowers, and pumps
  - ◆ Printing presses
  - ◆ Machine tools



Lathes



Milling machines



Printing Machine



Printing Machine



### 3. DC Compound Motor

- (Combination of shunt and series – cumulative or differential)
- Cumulative Compound Motor Applications:
  - ◆ Rolling mills
  - ◆ Punching machines
  - ◆ Shears and presses
  - ◆ Heavy planers
- ◆ Differential Compound Motor Applications:
  - ◆ Rarely used, but suitable for experimental or special drives requiring constant speed under varying load.



#### 4. Permanent Magnet DC Motor (PMDC)

- Characteristics: Compact, lightweight, no field winding, good efficiency.
- Applications:
  - ◆ Toys, electric bikes, and scooters
  - ◆ Portable tools (drills, screwdrivers, etc.)
  - ◆ Windshield wipers, car heaters, and blowers
  - ◆ Small robotics and actuators.

#### Summary:

1. Shunt motor → constant speed → machine tools, fans.
2. Series motor → high torque → traction, cranes.
3. Compound motor → mix of both → rolling mills, heavy machinery.
4. PMDC motor → compact & efficient → toys, tools, vehicles.

# SELECTION OF DC MOTOR

There are following factors of selecting a DC motor

## 1. Nature of Load

- Constant speed load → Use shunt motor (speed almost constant under varying load).
- Variable speed load → Use separately excited motor or DC chopper-controlled motor.
- Heavy starting torque required (e.g., cranes, hoists, traction) → Use series motor.
- High torque at low speed & constant power at high speed → Use compound motor.

## 2. Speed Control Requirement

- Wide and smooth speed control → Shunt motor or separately excited motor.
- Simple and economical speed control (by varying supply voltage) → Series motor

## 3. Starting Condition

- Heavy load at starting → Series or compound motor.
- Light load at starting → Shunt motor.



#### 4. Operating Characteristics

- Series motor → High starting torque, speed falls with load (suitable for traction, elevators, hoists).
- Shunt motor → Low starting torque, nearly constant speed (suitable for lathes, fans, blowers).
- Compound motor → Combines advantages of series & shunt (suitable for presses, rolling mills).