

# Train Lighting Systems

Special Requirements, Battery  
Systems, Coach Wiring & 25kV AC  
Lighting

# Special Requirements of Train Lighting

- • Reliable operation under vibration
- • Low maintenance & high durability
- • Energy efficiency
- • Safety under varying supply conditions
- • Emergency backup lighting
- • Resistance to shock, dust, humidity

# Objectives of Train Lighting System

- • Provide uniform illumination
- • Ensure passenger comfort
- • Maintain lighting during power failure
- • Safe electrical isolation
- • Minimize power consumption

# Unidirectional Polarity Constant Output

- • Ensures DC supply with constant polarity
- • Prevents flicker in lighting
- • Achieved using rectifiers & control circuits
- • Maintains stable voltage for coach lighting

# Single Battery System

- • One battery bank per coach
- • Charged via alternator or external supply
- • Simple and low cost system
- • Limited backup capacity
- • Used in short-distance trains

# Double Battery Parallel Block System

- • Two battery banks connected in parallel
- • Improved reliability and backup time
- • One battery supports load if other fails
- • Suitable for long-distance trains
- • Better voltage stability

# Coach Wiring System

- • Distributed wiring along train coaches
- • Includes lighting circuits, fans, and control circuits
- • Uses bus-bar or cable routing system
- • Proper insulation and protection required
- • Includes switch control panels in each coach

# Lighting using 25kV AC Supply

- • Power drawn from overhead 25kV traction line
- • Step-down transformer used in coach
- • Rectifier converts AC to DC supply
- • Used for lighting, fans, and charging batteries
- • Highly efficient for modern trains

# Advantages of 25kV AC Lighting System

- • Continuous power supply
- • Reduced dependency on batteries
- • High efficiency
- • Suitable for high-speed trains
- • Lower maintenance requirements

# Conclusion

- • Train lighting is critical for safety and comfort
- • Battery systems ensure backup reliability
- • 25kV AC systems provide modern efficient solution
- • Proper wiring ensures safe operation

# Battery System Diagram (Single & Double Battery)



# Coach Wiring Layout

