Traction Power System

INTRODUCTION

- This Traction Power System training course is set to deliver a comprehensive understanding of the fundamentals of Traction Power Supply in Railway Engineering and Systems and introduce the fundamentals and major components of the traction power network design process.
- Areas that use traction power networks include United Kingdom, Germany, Switzerland, Austria, Central Sweden, Southern Norway, USA, South Africa, Melbourne in Australia, and Riyadh in Kingdom of Saudi Arabia. In this training seminar, an overview of concepts in a generic traction power system along with case study examples will be provided. If you are working in a related area and need to understand the concepts of electrically powered railway systems, this course is for you.

This training course will highlight:

- Fundamentals of Traction Power Systems
- Major Components of Traction Power Supply
- Requirements for Traction Power Substation
- Considerations in Traction Power Network Design
- Track Electrification Concepts
- Overhead Catenary System and Components
- Conductor Rail System and Components

OBJECTIVES

By the end of this training course, participants will be able to:

- Understand the Fundamentals of Electrifying Railway Systems
- Apply design and equipment standards, guide documents other technical reference materials
- Develop a solid base in traction power substation, distribution system and overhead catenary system and components
- Comprehend robust traction power supply design
- Understand the installation and operations processes of electrically-powered rail networks

TRAINING METHODOLOGY

- This training course will have subjects presented by the instructor utilizing a variety of proven adult learning techniques, focused on case studies and best practices. This will include active participation, in class practice cases, followed by active group sessions, video materials and tabletop activities.

ORGANISATIONAL IMPACT

- Determine the best options and/or solutions in electrically - powered rail network problems
- Improve the operational processes, policies, and workflows
- Enhance their understanding of the traction power supply solutions
- Reduce costs in consulting services with up – to – date knowledge in the area
- Improve the comprehension of their decision-making skills

PERSONAL IMPACT

Upon attending this Traction Power System training course, all participants establish a solid foundation and gain practical experience in electrically - powered rail network related applications through the following:

- Identify the requirements for a traction power supply
- Develop an understanding in the design criteria and major components of a traction power network
- Adopt the adequate guidelines, design and equipment standards, and technical materials
- Understand the principles of AC and DC traction power systems
- Gain knowledge in overhead contact and third rail systems

WHO SHOULD ATTEND?

- This Traction Power System training course is suitable to a wide range of professionals but will greatly benefit, those who are involved in railway engineering, mass transit systems, infrastructure and railway safety, and railway management centers.

This training course is suitable wide range of professionals but will significantly benefit:

- Professionals and Officials in State Railway Systems
- Project Managers in Infrastructure Solutions Consulting
- Mass Transit Systems and Railway Engineers
- Railway Design Engineers
- Traffic & Transportation Engineers / Professionals
- Technicians in Railway Systems
- Researchers and Consultants
- Practitioners in Transit Systems

Course Outline

Introduction to and Requirements for Traction Power and/or Supply Systems

- History of Electric Traction
- Modern Electric Trains
- Requirements for Traction Power Systems
- Bulk Supply Substations (BSS)
- Traction Substations
- Power Distribution Network
- Parameters to be considered in the Design
- Safety
- Reliability
- Availability
- Maintainability

Traction Supply Systems

- Direct Current (DC) System
- Nature of Traction Load
- Means to Reduce Harmonics
- Automatic Assured Receptivity Unit
- Stray Current
- Touch Voltage
- Over Voltage Protection
- Alternative Current (AC) System
- Single Phase
- 3 - Phase
- Interference and Induction
- AC Traction Supply Feeding Method
- Booster Transformer Feed
- Direct Feed
- Auto - Transformer (AT) Feed
- Co-axial Cable Feed

Track Electrification – 1 (Overhead Catenary System)

- Design Consideration
- Overhead Catenary System
- Simple Construction
- Simple Catenary
- Stitched Catenary
- Compound Catenary
- Major Components
- Supports
- Cantilever
- Stagger

Track Electrification – 2 (Rigid Conductor System, 3rd Rail System, Track Embedded Coil)

- Rigid Conductor System
- Support on Soffit
- Components (By Saitong Railway Electrification)
- Installation
- Conductor Rail System (3rd Rail System)
- Top Running Conductor Rail
- Steel Rail
- Composite Rail
- Ramp
- High Speed Ramp
- Low Speed Ramp
- Side Entry Ramp
- Conductor Rail Joint
- Expansion Joint
- Mid-point Anchor
- Cable Termination Assembly

Long Stator Winding on Guideway and Conclusions

- Power Supply to Stator Sections Embedded in Guideway
- Long Stator Winding Linear Motor Principle
- Propulsion System
- Conclusions
- Basic Requirements of the Traction Power Supply for a Railway Network
- Types of Traction Supply and the Major Components
- Overhead Catenary System
- Conductor Rail System