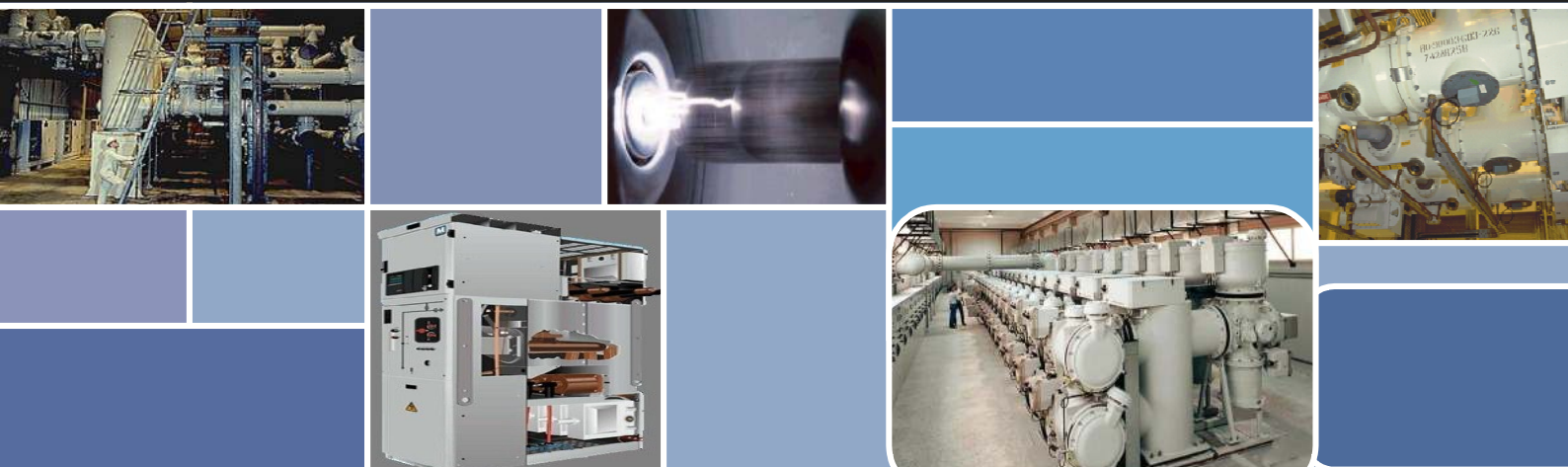


A 2-Day Professional Development Seminar on

Gas Insulated Switchgear and GIS Substation Essentials



*Your True Partner in Attaining
Professional Excellence*

Overview

There is a continuous increase in the application of Gas Insulated Switchgear (GIS) into Electric Power Transmission and Distribution substations. Gas Insulated Switchgear is the most modern form of High Voltage Switchgear. The superior dielectric and arc quenching properties of the SF₆ gas allow a substantial reduction in the size of the switchgear. GIS substations can therefore be smaller than conventional air-insulated substations. In a GIS, the active parts are metal enclosed and this increases the safety and reliability of the substation. Since the development of the first gas insulated switchgear in the late sixties, GIS technology has been used in both MV and HV switchgear.

This seminar aims to provide an overview of the most technical issues regarding GIS from both a manufacturer and user perspective. It is intended to assist engineers involved in the design, specification, installation, testing and maintenance of Gas Insulated Switchgear and substations. It covers many of the relevant topics in Gas Insulated Switchgear technology such as the understanding of the design and operation of the switchgear elements e.g. the Circuit Breaker, Disconnectors and Earth-Switches. The course also addresses GIS substation topics such as installation, substation design, insulation coordination, grounding, testing and condition monitoring.

Course Leader's Profile

Dr Jose Lopez-Roldan received his M.Sc. and Ph.D. degrees in Electrical Engineering from the University of Barcelona in 1993 and 1997 respectively. During his PhD studies he was visiting-researcher at the R&D centers of Ontario-Hydro (Toronto), Schneider-Electric (Grenoble) and EDF (Paris) where he did research on Electrical Insulation of High Voltage Switchgear.



He worked at VA TECH-Reyrolle in the UK from 1996 to 2000 as a senior engineer engaged in the development of Gas Insulated Switchgear. He joined Pauwels in Belgium in 2000 as R&D project manager in the Transformer division and from 2002 to 2006 as engineering manager of the Projects division, responsible of the engineering of substations. He moved to Australia in 2006 to work for Powerlink Queensland, where he acts as Principal Consultant in Gas Insulated Switchgear. All those professional experiences working for manufacturers, contractors and utilities have provided him with a privileged perspective of the GIS technology.

Jose has co-authored more than 30 papers in High Voltage Switchgear, Substations and Electrical Insulation. He is a senior member of the IEEE and the international working groups of the CIGRE D1.03 (Insulating gases) and A3.24 (Internal arc and current withstand in HV equipment). He is lecturing on circuit breakers and switchgear at the Queensland University of Technology (QUT).

Who Should Attend?

Technical personnel who are involved in the design, installation, operation and maintenance of Gas Insulated Switchgear (GIS) and GIS Substations, such as

- ◇ Power System Planners
- ◇ Electrical Engineers
- ◇ Power System Managers and Technical Officers
- ◇ Construction and Project Managers
- ◇ Power System O&M Engineers
- ◇ Power System Consultants

COURSE CONTENTS

1. Switchgear Fundamentals

- ◇ Current Interruption
- ◇ Electrical Insulation
- ◇ Electro-Magnetic Forces
- ◇ Thermal Behaviour

2. Element of Gas Insulated Switchgear (GIS)

- ◇ Description of GIS : Main Components
- ◇ Switching Components: Functions and Applications
- ◇ Technical Evolution
- ◇ Gas Circuit Breakers
- ◇ Disconnectors and Earth-Switches
- ◇ Structural Components: Bus-bars and Support Insulators

3. High Voltage GIS Substations

- ◇ Air Insulated Switchgear (AIS) versus GIS substations
- ◇ Basic GIS Substation Lay-outs
- ◇ Indoor and Outdoor GIS
- ◇ Hybrid Switchgear as An Alternative to GIS Substations
- ◇ Special GIS Substations: Mobile and Temporary Substations

4. Applications of GIS in Medium Voltage Substations

5. The SF6 Gas

- ◇ Why SF6?: Analysis of Fundamental Properties and Comparison with Air and Other Gases
- ◇ Reaction with Electric Arc and Decomposition Products
- ◇ Humidity and Acidity
- ◇ Factors Affecting the Performance of SF6
- ◇ Environmental Aspects

6. Insulation Coordination in GIS Substations

- ◇ Basics of Insulation Coordination
- ◇ Surge Propagation in GIS Substations
- ◇ Lightning Surges
- ◇ Specific Switching Transients in GIS: Very Fast Transient Overvoltages

- ◇ Effect of GIS Transient Overvoltages in Associated Substation Plant such as Cables and Transformers
- ◇ Problems Associated with Bus-bar Switching by GIS Disconnectors: Arc Break-Out

7. Grounding of GIS Substations and EMC

- ◇ Particularities of Earthing in GIS
- ◇ Low Frequency Earthing
- ◇ High Frequency Earthing: Transient Ground Potential Rise (TGPR)
- ◇ Electromagnetic Compatibility of Substation: Sources of Interferences, their Influence on Secondary Equipment and Decoupling Methods

8. Testing of GIS

- ◇ Type Tests and Routine Tests
- ◇ International Standards
- ◇ Temperature-Rise Tests
- ◇ Mechanical Endurance and Climatic Test
- ◇ High Voltage Testing
- ◇ Short-Circuit Testing
- ◇ Internal Arc-Fault and Pressure Rise

8. Condition Monitoring

- ◇ Reliability Centered Maintenance (RCM)
- ◇ GIS Condition Monitoring
- ◇ GIS Insulation Monitoring by partial discharge diagnostics

9. Trends in GIS Technology

CPD Recognition

This technical seminar is designed to meet the Continuing Professional Development (CPD) needs of participants. A Certificate of Attendance will be awarded at the end of the program. This serves as evidence of your personal and professional commitment to your career.