Design Of Electric Switchboards (lV and MV) Only Of Design and Engineering Engineers Training

Description

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Switchgear (and circuit breakers) are obviously critical components in electrical distribution systems and their operation significantly affects the overall operation of the system. The two day workshop will discuss application, installation, maintenance and testing issues relating to medium and high voltage switchgear and circuit breakers.

There will also be a coverage of low voltage switchgear. You will receive a thorough grounding in switchgear theory and standards. You will gain a solid understanding of the issues associated with the proper application, installation and maintenance of these critical items of equipment with an overriding emphasis on safety.

This comprehensive five day workshop emphasises medium voltage switchgear which represents most of the switchgear installed on electrical distribution systems. The focus here is on air blast, oil, SF6 and vacuum circuit breakers. Case studies covering the main manufacturer’s equipment will illustrate the important practical principles. Other power system protection components will be discussed as well to ensure that switchgear is understood in the correct context.

Course Objectives

Delegates will learn about the following:

- Selection of appropriate type and rating of circuit breakers and switchgear.
- Fundamentals of operation of switchgear. Switchgear components (CTs, VTs, relays, cable terminations)
- Safe operational policies including safety rules and safety documents.
- Able to discuss different LV for of separations. Fully understand how to size and select different type of motor starters.
- Diagnostic tools and test equipment for switchgears.

- Safe maintenance policies including safe working in switch rooms, indoor and outdoor substation

Course Outlines

- Introduction to LV & HV Switchgear.
- Breaking of AC currents
- Transient restrike recovery voltage (TRRV). Surge arresters.
- Metal clad & metal enclosed switchboards.
- LV forms of separation.
- Load flow studies (rated current).
- Calculation of fault currents (simplified methods, PU, MVA & Symmetrical components). Breaking & Making Capacities.
- Different types of LV Circuit breakers/contactors (ratings &tripping units/curves).
- Sizing of motor starters (DOL, Star/Delta, Auto transformer & soft starters).
- Fuse sizing for distribution transformers & motors.
- Type 1 & type 2 co-ordination for motor starters. Dimensioning of LV switchboards (MCC & power centers). Different types of HV Circuit breakers (Oil, Vacuum, Gas & Air type)
- Merits & demerits of each type of HV breakers. Different de-rating factors (temperature, altitude, etc …).
- Breaking capacity de-ratings according to IEC/ANSI C37.010.
- Bus bar sizing/cross sectional area/current density & skin effect.
- Specifications for switchboards.
- Overview of protection & measuring units. Different types electrical diagrams.
- Panel scheduling.
- Type & routine tests on switchgear.
- Course Evaluation & Summary