

PROTECTIVE DEVICE COORDINATION



What is the need?

Electrical system protection and coordination studies are key components to ensure that a facility's electrical system is operating in a safe and reliable manner. The reliability of Power system is challenged every time an expansion, reconfiguration, additional load or upgrade takes place. Short circuit and Coordination Studies help manage these complexities by ensuring that the protective device closest to an overload or short-circuit condition is the one that operates to quickly isolate a failure.

Advantages

- Increased facility reliability & Operating Efficiency.
- Minimize system downtime and nuisance device operations & false trips
- Avoid equipment damage or failure through increased system protection
- Isolate faulty circuits without loss of power to other parts of the system
- Identify corrective action for under-protected equipment
- Avoid unnecessary blackouts and brownouts to the electrical power system
- Ensure safety of personnel

Coordination studies guarantee fast, selective, and reliable relay operation to isolate the power system faulted sections.

The electrical system inside any facility undergoes many changes as a requirement of maintenance, reconfiguration and up gradation. A co-ordination study can help optimally maintain these apparatus, by avoiding accidents and help maintain continuity of supply. This study is an evaluation of the system's protective devices (circuit breakers, relays, fuses) for optimum performance. Also the adequacy of these devices is been evaluated so that they can sustain the through fault, without damage. In a properly coordinated system, a fault results in interruption of only the minimum amount of equipment necessary to isolate the faulted portion of the system. The power supply to other loads in the remainder of the system is maintained. The goal is to achieve an optimum balance between equipment protection and selective fault isolation that is consistent with the operating requirements of the overall power system.

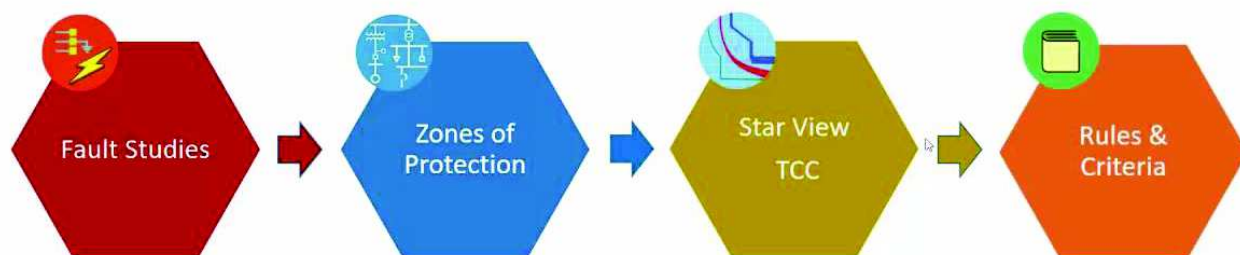
Our Protective Device coordination studies include:

- Relevant Data collection
- Power system analysis
- Final Report

Protection and Coordination Study

Study Procedure

- Traditional Study Steps



Phase Fault
Ground Fault
Through Fault Current

Motor & Load
Bus
Cable, Line & Transformer
Generator

Multiple Star View TCC
Zone Dependency
Navigation between TCCs

Protection Rules
Coordination Rules
Depends on User
Creation of Report

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Relevant Data Collection

Information on all the components, present settings and ratings of all protective devices, is obtained during a field visit. Also data is collected from electrical utility and product manufacturers, and then tabulated. Manufacturer's data – Each protective device has unique response characteristics, documented on manufacturer's "time-current curves" that are needed for the study. These details are also collected. The Single-line diagram is reviewed for details on equipment ratings, cable sizes etc., If the SLD is not available then the site engineers shall collect the relevant data required.

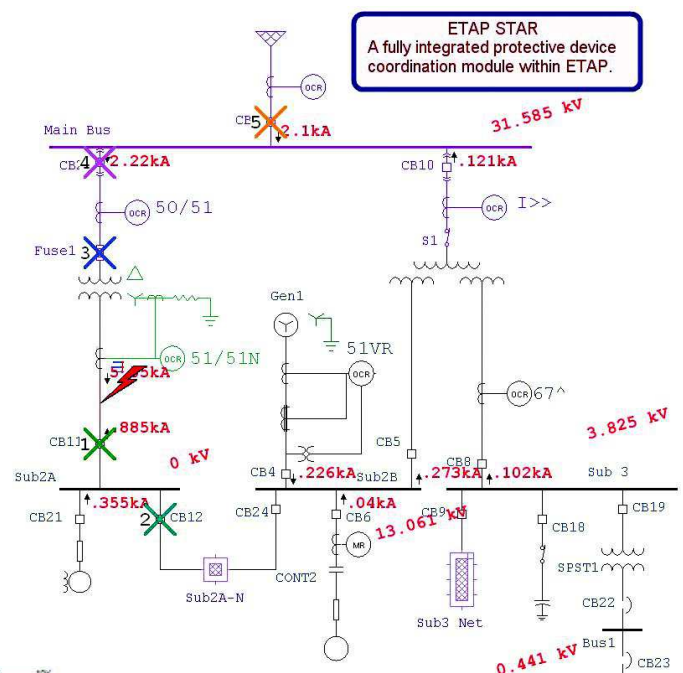
Power System Analysis

Once the data is collected, then the entire power system is modelled using dedicated Power System Analysis software, which shall help analyse the existing system and also help engineers determine the optimum settings of all the releases/relays to ensure proper co-ordination.

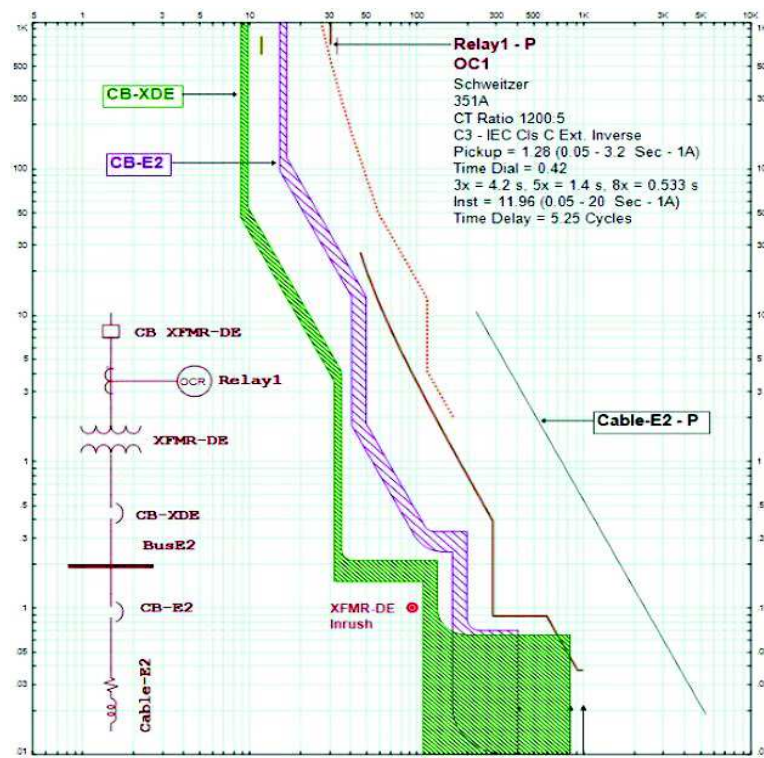
Final Report

After a detailed computer based analysis, an exhaustive report containing all the details is documented, these contain;

- Recommended settings for devices
- Time Current Characteristics (TCC) Curves indicating the co-ordination
- Adequacy of the existing protection system to protect the system from various faults/disturbances
- Suitability of the existing switchgear to handle the prospective fault current
- Updated SLD indicating the recommended settings and short circuit levels.



Summary



If the devices are not co-ordinated and properly set, the circuit breakers might demonstrate nuisance tripping or may not trip at all in the event of a disturbance/ fault. Also some healthy feeders might face power outage in the event of nuisance tripping. This might hamper critical loads from proper functioning

With short circuit and coordination studies, you get a better understanding of how your often-changing electrical distribution system currently operates. The coordination and settings of protective devices are thoroughly analysed, and based on the findings, you are able to improve protection for equipment and Personnel.