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Testing of Complicated Bus Bar Protection Using Smart Testing Methodology

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Abstract : In this paper, the protection of a complicated bus arrangement with a dual bus coupler and bus sectionalizer using low impedance differential protection applicable for very high voltages like 220kV and 400kV is discussed. In many power generation stations, several operational procedures are implemented to utilize the transfer bus as the main bus and to facilitate the maintenance of circuit breakers and current transformers (in each section) without shutting down the bay(s). Owing to this fact, the complications in operational philosophy have thrown challenges for the bus bar protection implementation. Many bus topologies allow any one of the main buses available in the station to be used as an auxiliary bus. In such a system, pre-defined precautions and procedures are made as guidelines, which are followed before assigning any bus as an auxiliary bus. The procedure involves shifting of links, changing rotary switches, insertion of test block, and so on, thereby causing unreliable operation. This kind of unreliable operation or inadvertent procedural lapse may result in the isolation of the bus bar from the grid due to the unpredictable operation of the bus bar protection relay, which is a commonly occurring phenomenon due to manual mistakes. With the sophisticated configuration and implementation of logic in modern intelligent electronic devices, the operator is free to select the transfer arrangement without sacrificing the protection required by a bus differential system for a reliable operation, and labor-intensive processes are completely eliminated. This paper deals with the procedure to test the security logic for such special scenarios using Megger make SMRT, bus bar protection relay to assure system stability and get rid of all the specific operational precautions/procedure.

Keywords : bus bar protection, by-pass isolator, blind spot, breaker failure, intelligent electronic device, end fault, bus unification, directional principle, zones of protection, breaker re-trip, under voltage security, smart megger relay tester
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