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An extended component-based reliability model for protective systems to determine routine test schedule

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Abstract: This paper presents a novel approach for evaluating the reliability of protective systems taking into account its components reliability. In this paper, a previously proposed extended model is used for a directional over-current scheme. In the extended model, the impacts of individual protective components are taken into account. An optimum routine test schedule is determined for each protective component as a separate unit. A comparison is made to show that the proposed approach has excellence over conventional routine test inspections. Impacts of factors such as circuit breaker inadvertent opening, required time for performing routine test inspections, human mistakes and self-checking and monitoring effectiveness is analyzed using the model. Redundancy in some parts of the protective system is examined. Permanent and transient faults on the protected zone, operation of backup protection and common-cause failures are also recognized in the model.

Key words: Reliability, protective system, routine test, redundancy

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