

عنوان مقاله:

The Effect of Condition Monitoring of Circuit Breaker on the Reliability and Maintenance Cost of Substation

محل انتشار:

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خلاصه مقاله:

Over the recent years, a number of new maintenances methods for high voltage substations have been introduced to reduce the number of substation events. The primary purpose of the present study is to presents a Cost-benefit analysis for Circuit-Breakers (CBS) in a substation equipped with Condition Monitoring (CM) devices. To this end, a mathematical formulation to categorize and model equipment failures based on their severity is developed. By CM, some of severity failures, named major failures, can be detected early, and corrected as the minor failure. This formulation quantifies the effect of CM devices on the outage rate and Predictive Maintenance (PDM) rate of the equipment. The PDM rate is used to modify the Markov maintenance model for the equipment. The proposed modified Markov model quantifies the effect of CM on the maintenance costs and lifetime of CB. The New Markov model is compared with the Preventive Maintenance (PM) model. Expected Energy Not Supply (EENS) and reliability Cost are calculated with and without CM on CBs. Finally, the proposed model is applied on the CBs of 400/132/20KV substation in the Khorasan Regional Electricity Company (KREC) in Iran. The obtained results show that CM on CBs of substations improves the EENS and reliability cost by 82.43 %. Moreover, the maintenance cost of the proposed model shows an improvement of 9.07 % compared to PM model. Finally, the total annual costs show an improvement of 80.67% due to CM on CBs.

کلمات کلیدی:

Condition Monitoring, reliability, Circuit Breakers

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