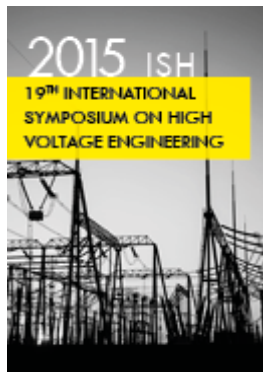

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Field experience with online monitoring of three-phase AC bushing system concerning its capacitance

Abstracts

Bushing is one of the important HV-components in power transformers. The insulation systems of the bushings are subjected to electric stress and environmental effects such as heat and moisture. In order to avoid the field distortion, graded capacitive control layers are widely used in the design of HV-bushings. So, the main capacitance (C) of the bushings is regarded as a key indicator for finding the possible partial breakdowns in the insulation systems. It is of increasing interest for transformer operators to evaluate the online conditions of the bushings, especially the conditions of their insulations in operation. According to an innovative algorithm for online monitoring of three phase ac bushing systems, an application concept is realized: Voltage transformers are applied for examining the symmetry of line voltages of the electrical power system. The capacitance monitoring is performed by measuring effective value of the ac voltage signals, because the diagnosis of main insulation capacitance is based on the measurement of the voltage amplitude. Furthermore, the requirement on the measuring setup is discussed, considering the bushing monitoring system mentioned above and the voltage transformers applied. Being not a separate reference system, the selection of voltage transformers is subject to less limitation, in comparison to general solutions which need to take the temperature coefficient of the involved equipment into account. As the field experience shows, the influence of temperature change and voltage fluctuation on the measuring results is well treated by using the online bushing monitoring system suggested. In addition, different types of faults such as single phase failure and multiphase failure of the three phase bushing system can be distinguished and further conditionally identified. Finally, the evaluation of quite a few field data is carried out for validation of the online monitoring system developed for transformer bushings. The results agree well with the real conditions of the three-phase high voltage bushings in service. In conclusion, the paper shows thus a promising approach for realizing an effective online monitoring system of high voltage transformer bushings. An outlook for further system development and field tests is given at the end of this paper.

More Informations :

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