

Overview



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Although transmission and distribution systems of electric energy can be claimed to be mature and extremely reliable, research and development efforts aimed at further improvement have never ceased, even in the difficult days of liberalization and cutting of funds for new investments in the utilities. The search for new solutions has been focussed towards reduction of maintenance costs by introduction of new procedures and employment of intelligence for the equipment provided by modern information technology tools.

Controlled switching of HVAC circuit-breakers, which is already widely applied for applications such as switching of capacitive and small inductive currents, is one of these solutions that can provide several technical and economical benefits. Avoidance of high inrush currents and serious temporary switching overvoltages as well as the reduction of the stress on an adjacent equipment or the maintenance burden on a frequently switched circuit-breakers are one of the most important advantages. The overall benefits were summarised in detail in a series of documents issued by CIGRE WG A3.07.

Japan has extensively developed controlled switching for a long time, thus having a long tradition in the subject. A new application to transformer energization considering the residual flux in the transformer core was realized and successfully demonstrated in a practical field. Controlled switching of power transformers can be a cost effective solution to mitigate the problem of high inrush currents, the latter may lead protective relay mal-operation and power quality reduction. The rapid advances in the use of digital equipment will soon open new possibilities for series compensated line, load & fault switching and circuit-breaker up-rating.

The special issue covers the basics of controlled switching and introduces the more common applications for capacitor and reactor switching and more recent developments for a state-of-the-art technology transformer switching. Testing requirements and the benefits of controlled switching will also be summarized based on the survey of CIGRE WG A3.07.

I gratefully acknowledge the contributors, who evolve in promoting research, design and testing of controlled switching systems at Mitsubishi Electric Corporation, presented an updated technical view of controlled switching systems. No doubt, these following series of technical papers will give guidance to the users on how to study, specify and test the controlled switching system and assist them to assess the effectiveness of the system in Japan.