

Master Thesis

Dimensionierung of Generator circuit breakers with regards to short-circuits

Motivation

In many plants, a circuit breaker is placed in the connection between the generator and the step-up transformer, which quickly and reliably disconnects the machine in the event of a fault. This breaker is often exposed to high stress levels, which is also reflected in a separate standard for generator circuit breakers (GCB). In particular, the requirements for asymmetrical short-circuit currents and for the voltage gradient of the recovery voltage are higher than for standard circuit breakers. The correct selection of generator circuit breakers is therefore a practical important task when planning the electrical equipment of power plants.

Research Topics

In this work, the main influencing variables for the dimensioning of generator circuit breakers are to be investigated by means of simulation calculations based on real plant data. This concerns among other things:

- Operating point of the machine, time of fault occurrence, influence of the connection between generator and breaker, influence of the switching arc.
- Influence of the capacitances between transformer and breaker on the transient recovery voltage, influence as well as dimensioning of surge capacitors.

Procedure/Methodology/Task definition

After selecting suitable data (preferably from a large hydropower plant), a model will be built in the Digsilent Powerfactory or EMTP-RV software, and thus the influence of the above-mentioned variables will be systematically investigated. A possible goal of the work is the creation of a guideline on how to proceed systematically in the dimensioning of generator circuit breakers.

Organisational Issues

Begin immediately

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