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Analysis of magnetic field and losses at endregion of directly watercooled hydropower generators

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Background

During a hurricane in January 2006 one of Statkraft AS synchronous generator at Svartisen experienced huge amount of stresses because of several short-circuits in the main grid of the Norwegian power system. With this followed a breakdown of the generator in August same year, and a new one in October. This lead to a outage of several months. The reason for this breakdown was due to overheating in the endpart of the stator.

This was the first and only time Statkraft AS experienced such a breakdown and they became more interested in this topic.

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Objective

A 3D-model based on data from one of Statkraft AS synchronous generator with directly water-cooled stator has been made in FEM-software ANSYS Maxwell.

The objective is to get a deeper understading on how the magnetic field at end-region in the stator varies at different loading situations with simulations of the 3D-model. Eddy-current losses will be analyzed.

