874 – Large Motor Starting with Flux Compensated Magnetic Amplifier

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Abstract: To reduce the constraints caused by starting a large motor in an industrial MV network, Flux Compensated Magnetic Amplifier (FCMA) system is adopted. With this technique, the motor line voltage is supplied by the main source while the neutral voltage is raised through an autotransformer. The difference between line and neutral voltage applied to motor windings is therefore reduced which diminishes the motor starting current. A brief review of the autotransformer design specifications will be given to outline the advantages of this method compared to the conventional autotransformer starting method.

Following an incident leading to FCMA's autotransformer damage, field investigation and measurement were conducted on-site to identify the causes. The issue could be related to the switching overvoltage at the end of starting period when FCMA was being bypassed to reestablish normal operation of the motor.

Modeling and simulations are made with EMTP ATP software. Simulation results are compared with measurements with good matches to better explain how the event would unfold. A mitigation solution has been proposed and its performance has been demonstrated.