

## Investigation on the resonant oscillations in an 11kV distribution transformer under standard and chopped lightning impulse overvoltages with different configurations of shield placements

### ABSTRACT

This paper presents an investigation on the resonant oscillations of an 11 kV layer-type winding transformer under standard and chopped lightning impulse overvoltage conditions based on calculated parameters. The resistances, inductances and capacitances were calculated in order to develop the transformer winding equivalent circuit. The impulse overvoltages were applied to the high voltage (HV) winding and the resonant oscillations were simulated for each of the layers based on different electrostatic shield placement configurations. It is found that the placement of grounded shields between layer 13 and layer 14 results in the highest resonant oscillation and non-linear initial voltage distribution. The oscillation and linear stress distributions are at the lowest for shield placement between the HV and low voltage (LV) windings.

**Keyword:** Resonant oscillations; Impulse overvoltages; Electrostatic shields; Transformer windings