INFLUENCE OF OPERATING CONTROL DEVICE OPERATION ON LEVEL OF ACTIVE POWER LOSS IN POWER TRANSFORMERS

Ershov A. O., Danylchenko D. O.
National Technical University
«Kharkiv Polytechnic Institute»,
Kharkiv

In 6-35 kV distribution networks often have to deal with the problem of voltage regulation in conditions of changing electrical loads. To maintain the voltage on the buses 6-35 kV in such conditions, load control devices are used. However, in the process of calculation and optimization of electrical modes of distribution networks by the criterion of minimum losses (consumption) of active power, changes in the level of active power losses in the transformer are not taken into account when switching the on-load tap-changer, which may affect the quality of optimization results. In this regard, the analysis of changes in the level of active power losses in the transformer when switching the on-load tap-changer is an urgent scientific and technical task.

As the transform factor decreases (on-load tap-changer switching to "-"), the active power losses increase in proportion to the square of the transformer load factor (sc), the position of the on-load tap-changer and inversely proportional to the square of the voltage level at the transformer inputs. At the same time, with increasing sc, the losses of active power increase significantly.

With increasing transformation factor (switching on-load tap-changer to "+"), the load losses of the transformer remain virtually unchanged, but the idling losses increase. The increase in active power losses is more significant as sc decreases.

The range of change of active power losses in the transformer in different positions of the on-load tap-changer depends on the load factor of the transformer.

Thus, the change in the loss of active power in the power transformer is ambiguous in the operation of the on-load tap-changer on different branches. The nature of the measurement of active power losses is determined by the load factor, the direction of switching the on-load tap-changers relative to the neutral position, the ratio of idle losses and load losses. In this regard, it is necessary to take into account the change in active power losses in the transformer during the on-load tap-changer, when performing voltage level optimization according to the criterion of minimum losses (consumption) of active power.