Experimental studies of currents flowing through the supports of an overhead power line

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Structural elements of high-voltage overhead power lines located underground are subject to chemical corrosion. In addition, they are affected by stray currents flowing in the ground caused by current-carrying elements of the overhead power lines (OPL). In the present study, a mathematical model has been developed to qualitatively and quantitatively evaluate leakage currents and spreading currents along the structural elements of OPL supports. The results are presented here.

Keywords: Chemical corrosion, leakage currents, overhead power lines, spreading currents, support elements.

Classical methods of theoretical electrical engineering fundamentals were used in the development of the universal mathematical model[8–10].

According to preliminary calculations, the currents I_{11}, I_{22}, I_{33}, flowing in the analysed circuits were within the range 40–50 mA. Experiments were conducted to measure the induced currents flowing through the guy wires of the support. The experiments were carried out on section no. 5138 of the Nura-Agadyr transmission line with a voltage of 500 kV located in the Karaganda region of Kazakhstan. The currents in the circuit formed by the upper cross-arm of the support and the guy wires were determined using a clamp-type ammeter type A17 (APPA Technology Corpo-