

## **Optimization of new technology for industrial production of cables with solid polymeric insulation for improvement of energetic networks of ultrahigh voltages.**

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### **Results**

The essence of development is to provide scientific and technical support of industrial production in Ukraine of world level EHV cables, which are not produced in CIS countries. The recommendations and technical solutions to optimization of new technology of cable production with solid polymer insulation for voltages up to 330 kV have been developed, in particular it has been developed new methods of optimization technology of insulation covering on the moving conductor and its nano-structural vulcanization in inclined type chamber. New methods are based on the development of:

- new criteria and mathematical models for evaluation of quality of polymeric insulation;
- models for optimization the characteristics of insulation, inclined vulcanization chamber and electric drives for moving conductor control, taking into account supply voltage drops;
- methods for optimization of technologies of induction temperature stabilization of conductor, extrusion covering of three layers of insulation on conductor and quick cooling them to a solid state with further heating, the regulation of linear and rotational motion of conductors with insulation, controls of thickness of each its layer and temperature in all zones of heat treatment.

It has been determined the control strategy of movement of conductor with insulation in vulcanization chamber for stabilization the thickness and eccentricity of each layer of insulation under transient occurring in the systems of variable-frequency electric drives. It has been developed the mathematical model for free sagging conductor with insulation moving in the inclined vulcanization chamber to determine the optimal parameters of chamber and electric drives. These parameters were used in the Simulink-model for determination of algorithms of elimination of transverse and longitudinal vibrations of the conductor taking into account the transient processes in the variable-frequency electric drive system. In conclusion it has been realized the optimization the control regimes of thickness and eccentricity of all the layers of insulation and temperature in each zone of the heat treatment of insulation.

The experiments were performed on plant "Pivdenkabel" (Kharkiv), which carried out industrial application received results according theme. The results of work have been also used during development of normative publication "Guide for the selection, installation, erection, testing and maintenance of cables with XLPE insulation for 220 kV and 330 kV. RD K28 -004: 2010." Kharkov, 2011.