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MODERN CONSTRUCTION OF ELECTRICAL TRANSMISSION LINES EQUIPMENT WITH ELEMENTS

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Annotation: This article deals with the task of sharply reducing energy losses in transmission, distribution and delivery of electric energy, as well as equipping high-voltage lines with modern structural elements.

Key words: power transmission lines, electricity, supports, current and voltage, overhead line, electric voltage, insulators, insulation

ОБОРУДОВАНИЯ СОВРЕМЕННЫМИ КОНСТРУКТИВНИМИ ЭЛЕМЕНТАМИ ЛИНИИ ЭЛЕКТРИЧЕСКИХ ПЕРЕДАЧ

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Аннотация: В данной статье рассматривается задача резкого снижения потерь энергии при передаче, распределении и выдаче электрической энергии, а также оснащение высоковольтных линий современными конструктивными элементами.

Ключевые слова: линии электропередачи, электричество, опоры, ток и напряжение, ВЛ, электрическое напряжение, изоляторы, изоляция.

Currently, along with the task of increasing the energy capacity of all energy sources, there is the task of sharply reducing energy losses in the transmission, distribution and delivery of the produced energy. Most of the currently operating power supply systems, including power transmission lines, which are an important part of the power forecasting system, do not work with high efficiency, the power losses in them are higher than the established norm, and frequent accidents occur. The main reason for this is that the power transmission line devices and equipment are outdated, their installation does not meet the requirements. One of the main tasks of the modern electric power sector is the formation of high-efficiency and energy-efficient power transmission lines.[1]

Electric energy is drawn in the open air, and the transmission and distribution facilities are called overhead power lines. Wires are fastened to supports, brackets, wire wood, etc., to insulators and fittings. Air lines are considered for all voltages and are divided into air lines up to 1000 V and air lines above 1000 V according to the characteristics of their construction. Bases and their foundations, insulators, wires, protective cables and line fittings are the main constructive elements of overhead lines.

Insulators. It includes electrical and mechanical stress in different atmospheric conditions. For overhead lines of 6-35 kV, rod or suspension insulators are used, and for overhead lines of 110 kV and above, only suspension insulators are used. The number of insulators depends on the voltage of the overhead line, the type of insulator, the function of the garlands and the type of support. For 110 kV overhead lines, glass PS type suspension insulators as shown in Fig. 1 are used 7 pieces. For normal conditions, the number of PS-type insulators in suspended girdles used on metal or reinforced concrete supports is as follows;

3 units on lines with a voltage of 35 kV.

7 pieces in lines with a voltage of 110 kV.

13 units in lines with a voltage of 220 kV.

Figure 1. General view of PF type insulator

The number of insulators used in such supports is reduced by one or two pieces compared to the number of insulators in the corresponding garlands used in metal supports.

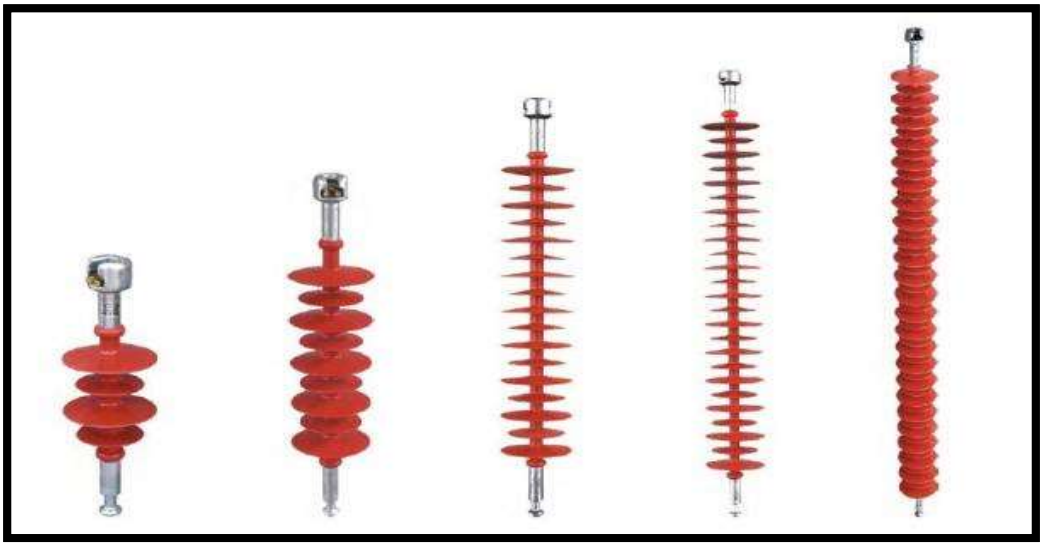

Figure 2. General view of LK-70-110 SHULX type polymer insulator

In order to reconstruct the air line that is currently being designed, instead of the garland insulators of the PF type used in the air line, it is appropriate to choose polymer insulators of the LK-70-110 type, which meet the requirements of the present time, as shown in Figure 2. [3]

Advantages of polymer insulators compared to porcelain PF and glass PS insulators:

1. Good moisture release properties in polluted conditions due to hydrophobicity
2. Significantly lower cost compared to glass insulators in 110 kV overhead line
3. 7-10 times heavier than PF and PS insulators, and 3 times less complicated to install on power lines
4. Low transportation costs due to weight reduction for delivery to any distance
5. Resistance to mechanical effects
6. Ease of transportation
7. Low susceptibility to radio interference compared to PF and PS types.

Table 1. The data of the isolates compared are given below

№	*LK-70-110 SHULX type polymer insulator*	*PF – type garland insulator*
1	The price is one set 344598 soums	The price is one set 630,000 thousand soums
2	Works constantly	Permanent external insulation requires control
3	Test voltage 400 kV	Test voltage 400 kV
4	The mass is 12 kg	The mass is 22 kg

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