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PS 2: Optimised substation management

Repair cost planning as a reliability factor

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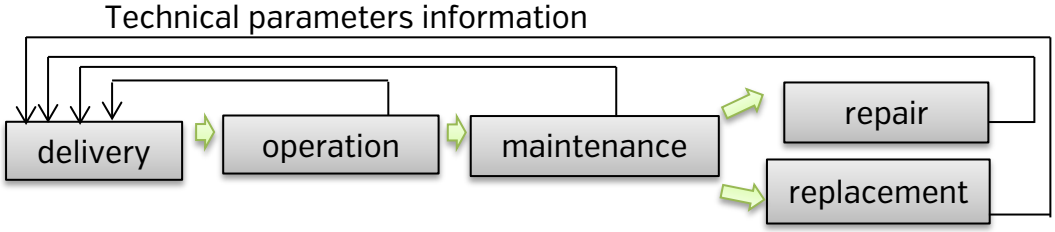
The article addresses the issue of repair cost planning where the least required amount of budget for maintenance and repair aimed at ensuring the reliability of power supply, with regard to capital return rate, is substantiated by comparing the optimal value of remanent operating life and arbitrary failure rate.

To date the reliable operation of Unified energy system of Russia (UES) is one of the key factors for the sustainable development of national economy and wellbeing of the population.

The responsibility of PJSC FGC UES is to ensure the reliable operation of UNPG (uninterruptable electricity transmission via UNPG networks in the amount needed and proper quality) that connects the major power generation facilities and power consumption within the country and links the UES of Russia with power systems of other countries. The reliability is assessed by specific indicators and these indicators become one of the major criteria in shaping the repair programs.

On the one hand, PJSC FGC UES has to ensure the reliability of power supply for consumers, which under circumstances of physical and mental wear of the electrical power equipment can be carried out only through maintenance and repair (M&R). Today the M&R cost planning approach based on technical condition of the equipment is recognized as the most effective one. On the other hand, under current conditions of tightening the requirements for power grid companies in terms of increasing the operational efficiency and cost reduction, the company has to optimize the equipment repair costs.

The article deals with the existing methods for evaluating the technical condition of the equipment in order to substantiate the method of influencing a specific unit of equipment, however substantiating the budget for M&R costs of same-type equipment or the entire extent of electrical equipment is rather painstaking and difficult-to-use. In order to ensure the systematical approach and comprehensive consideration of the totality the entire power grid company equipment, the task of developing a methodology for substantiating the required volume of M&R costs to maintain the level of reliability of a group of same-type equipment or its total number becomes high on the agenda (Fig. 1).



Assets management structure

Fig. 1. Assets life cycle

Leveling problems and extending the life cycle was assessed, as well as reducing the failure rate in order to maintain the technical parameters of the equipment in the normative state. It's possible through work, which requires planning and implementation maintenance and repair costs.

According to state standard, purpose the system of M&R is to manage the technical condition of the equipment throughout their service life (or resource before write-off), which allows to provide a given high level of their readiness for use for the intended purpose and efficiency in the process of operation at minimum cost of both time and money for the performance M&R equipment.

It is confirmed that the planning M&R costs is aimed at achieving reliability and the following priorities:

- accident-free passage of the autumn-winter period and ensure the reliable functioning of the UNES as a whole;
- maintaining equipment of substations and overhead lines in the normative technical condition;
- completion of the item repair (physical volumes) on transmission lines and main equipment of the substation to 01 October of the proposed year with the aim of obtaining a passport of readiness to operation during the heating season;
- the strategy of the long-Term program of development the power grid complex for the period 2015-2019.