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INFLUENCE OF CONCRETE GRADE OF POWER LINE SUPPORTS ON THE RESULTS OF VIBRATION DIAGNOSTICS

In this work, the categories of technical condition of the drainage of power line supports and the dependence of the composition of concrete on the measurements taken during vibration diagnostics were given. In addition, an algorithm for assessing the category of technical condition of a power transmission line support is shown.

To date, the process of periodic assessment of the technical condition of power transmission line supports (transmission lines) is necessary. All components of power transmission lines are subject to mandatory technical inspection, which is carried out at least once every 5 years, when major repairs are provided once every 12 years. [1]

The results of the technical condition of the transmission line elements are divided into 4 groups, which are shown in Table 1.

Table 1
Category of technical condition construction of power transmission poles

| Category | Description | Necessary actions |
|---------------------------------------|--|--|
| Category 1 – normal condition | There are no visible defects that could lead to a decrease in load-bearing capacity. Carrying out repair and restoration work is not necessary | Planned technical diagnostics. |
| Category 2 – satisfactory condition | Minor defects. Current repairs are required, with the elimination of defects in a certain place, while eliminating the need to strengthen the structure. | Scheduled technical diagnostics, preventive maintenance. |
| Category 3 – unsatisfactory condition | There are significant damages that lead to a | Full technical diagnostics, targeted |

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| | decrease in load-bearing capacity. | repair, replacement of individual elements. |
| Category 4 – pre-emergency, emergency condition | Significant defects that lead to equipment failure. | dismantling, complete replacement of the structure. |

All available recommendations necessary for the repair of all elements include methods and sequence of work that establish certain requirements for materials for repair and technical means for performing these works. Completed repairs are accepted with a visual inspection.[2] But only visual and instrumental inspection is not enough, non-destructive testing is also necessary. One of its types is vibration diagnostics, which allows you to detect local defects, their exact location and type of destruction. Vibration diagnostics is applicable in order to assess the strength and deformative properties of elements.[3]

In this work, a reinforced concrete support of power lines was selected as an object of research for vibration diagnostics. The studies carried out also depend on the composition of concrete, which is shown in Table 2.

An overhead power line (overhead line) is one of the important elements of the electric power industry and its efficiency directly depends on the 3 main overhead line structures – supports, wires and insulation. The listed components depend on the state of the environment, for example, due to frequent precipitation, corrosion and aging of the material occurs [4].

Table 2
Characteristics of concrete [5]

| Composition | Density, kg/m ³ | Modulus of elasticity, МПа | Strength at 28 days of age, МПа | Adhesion to concrete, МПа |
|--|----------------------------|----------------------------|---------------------------------|---------------------------|
| Modified fine-grained concrete | 2320 | 26,0*10 ⁻³ | 35,8 | More than 1.5 |
| Two-component polymer-modified dry concrete mix EMASO T350SL | 1990 | 20,0*10 ⁻³ | 30,0 | More than 1.5 |
| Cement-sand concrete | 2280 | 24,5*10 ⁻³ | 32,0 | More than 1.5 |

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