RESULTS OF TURBOGENERATORS EXPERIMENTAL INVESTIGATIONS FOR THE POSSIBILITY ASSESS OF EXTENDING THEIR SERVICE LIFE

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At the power plants of Ukraine, as well as at the power plants of many other countries, turbogenerators (TG) operate, which have the operating time more that the period set by the manufacturer. TGs that operate for a long period and have formally worked out their resource require constant enhanced monitoring of their condition. This is necessary in order to timely identify, eliminate or slow down the development of obvious and hidden defects of the TG, ensure their reliable operation and extend the service life. We have analyzed the results of a comprehensive diagnostic examination of the TGV-200M-U3 turbogenerator, the operation period of which exceeds the passport period by 15 years.

Experimental studies were carried out in two stages at the TPP unit:

- during the operation of the TG on the network, an extended study of the vibration state was performed. For this, additional vibration sensors were installed on the generator housing. Vibration measurement was carried out during the operation of the TG on the network for two steady load modes in the frequency range of 10-1000 Hz;

- during the period of overhaul (with the withdrawal of the rotor), technical diagnostics, visual and instrumental control of the state of the stator and rotor were performed:

1) the density was controlled and the state of the toothed zones of the extreme packages of active steel was determined by the ultrasonic method. The measurements were carried out on all teeth 1-4 of the outer packs of the stator core from the TG boht side. Weakening and increased mobility of the pressure fingers were found;

2) an electromagnetic control of the insulation of the stator core sheets was carried out to determine local short circuits using a special device with ring magnetization with an induction of 0.02-0.05 T. The method is based on the location of the magnetic flux displaced from the steel during the formation of local circuits;

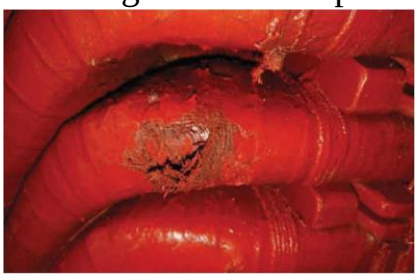

Fig. 1. Damage to the cover tape of the stator winding insulation at the exit point of the rod from the groove

3) visual-instrumental control of the stator winding and its fastening system made it possible to reveal a weakening of the fastening density of individual slot wedges.

We determined the weakening of individual parts of the system for attaching ring connecting busbars and the mobility of fiberglass spacers in busbar supports. When examining the fastening system of the frontal parts, significant gaps were revealed between the brackets located in the upper half of the stator and the shroud rings of the baskets of the frontal parts. The control made it possible to search for defects in areas that are not controlled during visual inspection. A search was carried out and damage was found to the covering tape of the stator winding at the exit point of the rod from the groove, fig. 1. The damaged sections of the insulation were replaced, which made it possible to exclude an emergency stop of the TG due to a short circuit of the winding to the core.