ANALYSIS OF OIL POWER TRANSFORMER RESOURCES THROUGH VIBRODIAGNOSTICS

Kodirov Khusanhon Munavarkhan ugli, Yuldashev Shukurullo Nematjon ugli
Fergana Polytechnic Institute
E-mail: xusanxonqodirov231@gmail.com

ABSTRACT

The rapid methods of evaluating the technical condition of oil power transformers under operating conditions were studied. Determining the compressive strength of transformer coils by vibration control method reduces technical and economic costs.

Key words: transformer, coil, vibration parameters, vibration speed, vibration acceleration. compressive strength.

INTRODUCTION

Analysis of the resources of oil power transformers in operation today is of great importance in the field of electrical engineering. There are dozens of ways to evaluate transformer resources, i.e. diagnostics. They are mainly divided into two groups: operational (working) and unloaded (disabled) [1].

In a working transformer:

- Control of heating according to a special program with taking oil samples according to a special technique.
- Vibrodiagnosis.
- Measurement of partial discharges by acoustic method.
- Measurement of partial discharges by electrical method.
- Management of the thermal image of the transformer.
- Measuring the distribution of the magnetic field in the transformer tank.
- Measurement of currents in the neutral and grounding of the transformer tank.

In a switched off transformer

- Measurement of dielectric properties of transformer insulation at two temperatures according to conventional schemes and by zones with assessment of accuracy of measurements.
- Measurement of absorption properties of insulation by determining the degree of polymerization.
- Measurement of current and no-load losses at reduced voltage.
- Measuring the resistance of the coil in alternating current.
- Short circuit resistance measurement.

- Vibration diagnostics of the active part by the software-hardware complex to evaluate the compression of the windings.
- Vibrodiagnostics of oil pumps and fans of the cooling system using the hardware and software complex.
- Measurement of dielectric properties of bushings.
- Oil sampling and analysis from oil filled inlets.
- Analysis of silica gel from adsorbent and thermosiphon filters.
- Checking the tightness of the seals of the inlets.

analysis, correlation analysis methods were used in the research process.

RESEARCH RESULTS AND THEIR DISCUSSION

Oil-filled power transformers were seen to vibrate at different points of their outer shell during operation.

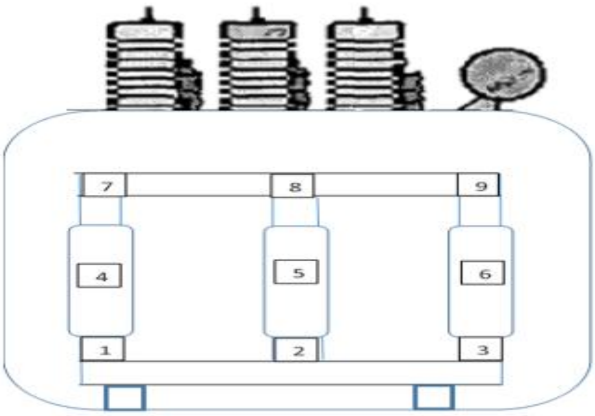

Figure 1. Recommended mounting locations for vibration speed sensors in the transformer tank

The vibrations generated by the magnetic core and coils, which are the active parts of the transformer, are indirectly transmitted to the outer shell due to the loosening of the density. As a result of the research, the vibration speed of 500 Hz frequency was obtained in the outer shell of the transformer.

Table 1.

Results of measuring the vibration speed of the 10/0.4kV transformer

Measuring point	Oscillation speed cm/s
1	0.4
2	0.4
3	0.3
4	0.2
5	0.2
6	0.2
7	0.1
8	0.1
9	0.05

The obtained results show that the vibration speed of the outer shell of the transformer is different. Because vibration does not propagate equally through different materials and environments.

The active part of the transformer is reinforced with a magnetic core and coils on the outer shell through the base. The arc sides of the shell can make a mutual vibration connection with the active part only through the oil.

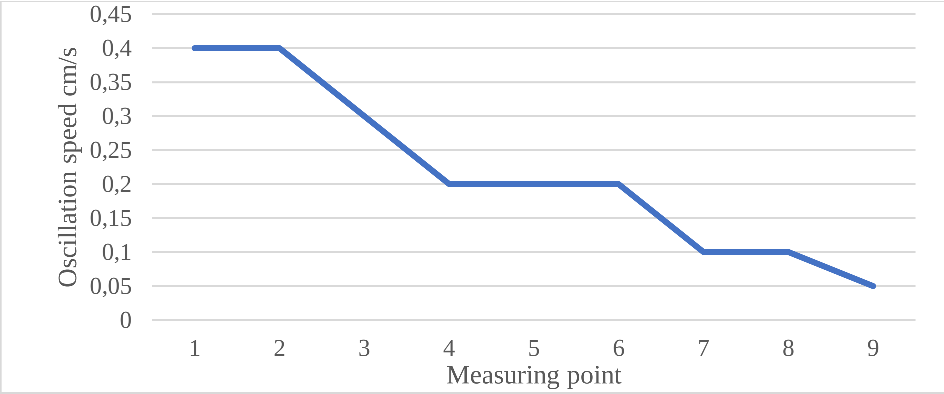

Figure 2. The speed of vibration propagation along the surface of the transformer.

REFERENCES:

1. A. Yu. Guryanov. Sovremennye metody diagnostici silovykh transformerov// Energoobespechenie, energosberezhenie i effektivnoe ispolzovanie energii 310-312 c.

2. Rusov V.A, Sofina N.N. "Vibratsionnoe obsledovanie i diagnostika sostoyaniya transformerov" // Methody i sredstva otsenki sostoyaniya Energeticheskogo oborudovaniya. Vypusk 11. Spb.: PEIPK, 2000. — p. 38-53.

3. Султонов Р. А. У., Кодиров Х. М. У., Мирзалиев Б. Б. Выбор механических двигателей электрического тока, используемых в системе электропривода //Проблемы современной науки и образования. – 2019. – №. 11-2 (144). – С. 26-29.

4. Кодиров Х. М. Инновации в реформе непрерывного образования в Республике Узбекистан //ISJ Theoretical & Applied Science,(01 (81)). – 2020. – Т. 777.

5. Usmonov S. Y. Analysis of Working Modes of Well Pumping Equipment Eectr //Central Asian Journal of Theoretical and Applied Science. – 2022. – Т. 3. – №. 11. – С. 119-125.

6. Yulbarsovich U. S., Nurillaevich M. N. FREQUENCY CONTROL OF POWER EQUIPMENT DURING SECONDARY STEAM GENERATION IN THE PRODUCTION UNIT //PRINCIPAL ISSUES OF SCIENTIFIC RESEARCH AND MODERN EDUCATION. – 2022. – Т. 1. – №. 6.

7. Yulbarsovich U. S. et al. MEASUREMENT AND CONTROL OF THE LOAD OF ENERGY DEVICES //Galaxy International Interdisciplinary Research Journal. – 2023. – Т. 11. – №. 4. – С. 663-666.
8. Yu U. S., Sultonov R. A. NONLINEAR FEEDBACK CONTROL IN INTELLIGENT AC MOTOR CONTROL //Advancing in research, practice and education. – 2022. – Т. 9. – С. 188.
9. Усмонов Ш. Ю., Султонов Р. А. У., Кучкарова Д. Т. СИНТЕЗ АЛГОРИТМОВ ИНТЕЛЛЕКТУАЛЬНОЙ СИСТЕМЫ УПРАВЛЕНИЯ МНОГОСВЯЗНЫМИ ЭЛЕКТРОПРИВОДАМИ //Universum: технические науки. – 2022. – №. 1-3 (94). – С. 50-53.
10. Усмонов Ш. Ю., Кучкарова Д. Т., Султонов Р. А. Автоматические системы управления машин и агрегатов шелкомотания на основе энергосберегающего электропривода //Universum: технические науки. – 2021. – №. 12-6 (93). – С. 37-41.
11. Sultonov R. A., Shermatov B. A. IMPROVING PRODUCT QUALITY BY REDUCING THE ENERGY CONSUMPTION OF ELECTRIC DRIVES IN THE SILK INDUSTRY //Экономика и социум. – 2021. – №. 11-1 (90). – С. 538-544.
12. Mukaramovich A. N., Yulbarsovich U. S. CALCULATION OF THE SPEED CONTROL RANGE OF AN INTELLIGENT ASYNCHRONOUS ELECTRIC DRIVE DURING REWINDING RAW SILK //ЭЛЕКТРИКА. – 2011. – №. 4. – С. 26-28.
13. Арипов Н. М., Усмонов Ш. Ю. Разработка энергосберегающего частотно-регулируемого асинхронного электропривода с вентиляторной нагрузкой //Электрика. – 2011. – №. 4. – С. 26-28.
14. Усмонов Ш. Ю. Частотно-регулируемый асинхронный электропривод с экстремальным управлением для вентиляторной нагрузки //Advances in Science and Technology Сборник статей X международной научнопрактической конференции, Москва:«Научно-издательский центр «Актуальность. РФ. – 2017. – С. 36-38.
15. Арипов Н. М. и др. Основные технические требования по диапазону и точности регулирования скорости перемотки шелка-сырца //Вестник Казанского государственного энергетического университета. – 2021. – Т. 13. – №. 1 (49). – С. 218-231.
16. McCray T. R., Gritzner C. F. Uzbekistan. – Infobase Publishing, 2009.
17. Арипов Н. М., Усмонов Ш. Ю., Кучкарова Д. Т. Влияние изменения скоростных режимов переработки полуфабриката на энергоемкость шелкомотания //Текстильный журнал Узбекистана. – 2021. – №. 2.