



OPERATION OF ELECTRIC MACHINES. TESTING, STANDARDS AND SIZE OF TRANSFORMERS AFTER OVERHAUL.

Usmonov Inomjon Isroilovich

Doctor of Philosophy in Engineering Sciences (PhD)

Mirzayev Islambek Umarali ugli

Kokand branch of Tashkent State Technical University, Student

Bakhriddinova Dilnora Sharifjon kizi

Kokand branch of Tashkent State Technical University, Student

Khusanova Sarvinoz Alisher kizi

Kokand branch of Tashkent State Technical University, Student

Article history:	Abstract:
Received: 20 th April 2023	This article, we will discuss the operation of electric machines, testing and standards, and the size of transformers after overhaul
Accepted: 20 th May 2023	
Published: 21 st June 2023	
Keywords: Electric machines, Operation, Testing, Standards, Sizes, Transformers, Overhaul	

INTRODUCTION: Electric machines are used in various applications including power generation, transmission, and distribution, as well as in industrial processes and consumer products. These machines include generators, motors, transformers, and other types of electrical equipment. The operation of these machines requires proper testing, maintenance, and overhaul to ensure that they operate efficiently and safely.

OPERATION OF ELECTRIC MACHINES

Electric machines convert electrical energy into mechanical energy or vice versa. They operate using the principles of electromagnetism and involve the interaction between magnetic fields and electrical currents. The four basic types of electric machines are generators, motors, transformers, and switchgear. Generators convert mechanical energy into electrical energy. They operate by rotating a magnetic field through a stationary coil of wire, inducing electrical energy in the coil. Generators are used for power generation in power plants and other large-scale applications. Motors, on the other hand, convert electrical energy into mechanical energy. They operate by creating a rotating magnetic field in the motor, which causes the rotor to turn. Motors are used in a wide range of applications, from household appliances to industrial equipment. Transformers are used to transfer electrical energy from one circuit to another. They work by changing the voltage and current levels of alternating current (AC) power. This allows for the efficient transmission and distribution of power. Switchgear is used to control the flow of electrical power and protect electrical equipment from overcurrents and faults. It

includes circuit breakers, fuses, and other devices that interrupt or isolate electrical circuits.

TESTING AND STANDARDS

The proper testing of electric machines is essential to ensure that they operate safely and efficiently.

There are several types of tests that are conducted on electric machines, including

- 1) insulation resistance tests,
- 2) dielectric tests
- 3) load tests

Insulation resistance tests are used to measure the resistance of the insulation between the windings and the frame of the machine. This test is important to ensure that the insulation is intact and that there are no leaks or other defects that could cause electrical faults. Dielectric tests are used to test the insulation properties of the machine under high voltage and high frequency conditions. This test is typically conducted at twice the rated voltage of the machine to ensure that there are no insulation breakdowns or other problems. Load tests are used to test the performance of the machine under actual operating conditions. This test involves loading the machine to its rated capacity and measuring its output to ensure that it meets specifications. Testing of electric machines is subject to various industry standards, including the National Electrical Manufacturers Association (NEMA), the International Electrotechnical Commission (IEC), and the Institute of Electrical and Electronics Engineers (IEEE).

SIZE OF TRANSFORMERS AFTER OVERHAUL

Transformers are critical components of electrical power systems. After overhaul, transformers may need to be resized to meet new load conditions or other changes in



specifications. The size of transformers is determined by their kVA rating, which is based on the transformer's output voltage, current rating, and efficiency. When resizing a transformer, several factors must be considered, including the new load conditions, ambient temperature, and the expected lifespan of the transformer. The new size of the transformer is determined based on the expected load conditions and the available space in the substation.

CONCLUSION

Electric machines play a critical role in modern society, providing power for a wide range of applications. To ensure that these machines operate safely and efficiently, proper testing and maintenance are essential. Transformer resizing is an important consideration after overhaul to ensure that the transformer meets the new load conditions and specifications. Industry standards provide guidance for testing and maintenance of electric machines and should be followed to ensure the safe and efficient operation of these machines.

LIST OF USED LITERATURE

1. "Elektr Mashinalar" - M.A. Utegenov;
2. "Elektr Mashinalarning Sinash va Tekshirish Metodikasi" - F.N. Garshin;
3. "Elektr Mashinalarning Optimal Struktura va Uskunalari" - L.G. Beylina;
4. "Elektr Priborlar va Komponentlar" - E.N. Kalinin;
5. "Elektr Energiya Sistemalarining Struktura va Intellektual Boshqaruv" - M.I. Yuldashev.
6. Fitzgerald, A. E., Kingsley Jr, C., & Umans, S. D. (2013). Electric machinery. McGraw-Hill Education.
7. Bhargava, R. K., Sharma, D. K., & Kothari, D. P. (2010). Electrical machines. Tata McGraw-Hill Education.
8. ANSI/NEMA Standards Publication. (2018). NEMA Standards Publication MG 1-2016 Motors and generators. National Electrical Manufacturers Association.
9. IEC Standards. (2021). International Electrotechnical Commission.
10. IEEE Standards Association. (2021). IEEE-SA - The IEEE Standards Association.