

Review on to Increase Sustainable Capacity of Fuse Holder

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Abstract:-In substation if any fault occurs, the system voltage may rise beyond the certain level due to which the fuse holder may damage and it happens due to low quality of insulation or dielectric material. Nowadays ring main unit are their which consists of number of switchgear equipment one of them is fuse which is having fuse holder. The project deals with the increase in the sustainable capacity of fuse holder. And to check the capacity we analyse the results with the help of simulation which helps to reduce time of remanufacturing and retesting. And here different test are carried out on the fuse holder to check the performance the test are partial discharge test and high voltage test.

Keywords: - Fuse holder, Dielectric material, Ring main unit, Partial Discharge test, simulation.

I. INTRODUCTION

Nowadays the high voltage power equipment are used in various places such as substation, in RMU i.e ring main unit. And that power equipment are made of different types of high quality insulation material so as to protect the equipment against high voltage stress. Most widely used solid insulation material is Epoxy resin. It is very tedious issue to check the quality of the insulation when the equipment is under operation for long time. The equipment used at the secondary distribution is nothing but ring main unit which consists of fuse and fuse holder. Nowadays the problems are faced when the equipment suffers from high voltage stress which results into damage of insulation, which causes partial discharge. Here we are mainly focusing on partial discharge effect and likewise we are going to increase the sustainable capacity of fuse holder by doing analyse with the help of software so the time required as well as cost required will be less. Like wise results are observed.

1.1 Ring Main Unit

It is an assembly of switchgear equipment enclosed in metallic cubicle. It is used at the secondary distribution side. It is totally sealed gas insulated unit which is a compact switchgear unit. The ring main unit is fully insulated with the gas and the range of voltage is depends on the pressure of insulation. It assure prompt supply restoration, network flexibility, higher reliability. It is used for medium voltage networks.

1.2 Fuse Holder

Fuse holder is the part of fuse. Fuse is used for the protection purpose of the system and the fuse holder is the device for mounting the fuse and protecting the person form direct

contact. The fuse holder should be waterproof, vibration resistant. The insulation material used recently is epoxy resin material, and to increase the sustainable capacity of the fuse holder material some modification are done to increase the dielectric strength of the insulation and analysis is done with the help of software. Mainly partial discharge effect is the most prominent effect which is taken into consideration while analysis. Here two test are carried out on the fuse holder via partial discharge test and high voltage test.

II. TEST TO BE CARRIED OUT

2.1 Partial Discharge Test

Partial discharge is the localized electrical discharge that partially bridges the insulation between conductor. Generally it occurs on the surface of the insulation. Such discharge can be impulsive and the duration of this discharge is less than 1sec. The partial discharge rate should be less but the voltage at which the discharge occurs should be more. Most the the insulator contains some impurities due to which some void are formed which results into occurrence of partial discharge effect. In this test the material is subjected to high voltage for 1sec and in between that time the discharge rate is observed.

2.2 High Voltage test

High voltage test is carried out the ring main unit. In this test the fuses along with fuse holder in the ring main unit are subject to high voltage for the particular time most probably 1sec. The voltage is gradually increased and the tripping is observed the value at which fuses trip is the maximum voltage that the system can handle .For the analysis purpose following amount of voltage is given to the system for 1 min.

Rating of RMU in KV	Voltage Applied
17.5	38
24	50
36	70

III. SIMULATION

Simulation based projects are comes into existence only because the task done in the software instead of being done practically. It helps to reduce time of remanufacturing and retesting to check the performance of the equipment until desired results we get. Simulation is the most helpful thing for the engineers.

REFERENCES

Here also we are analysing the properties of fuse holder with the help of simulation by using the software.

IV. CONCLUSION

Here in the review of the study we conclude that the the software based model is used on which analysis are going to be done. Therefore to look out the problems is very important for the system to maintain the reliability. And this study will also assure the design and testing engineers to forecast the quality of the insulating material used for the fuse holder.

- [1]. G. C. Crichton, P. W. Karlsson and A. Pedersen, "Partial Discharges in Ellipsoidal and Spherical Voids", IEEE Trans. on Dielectric and Electrical Insulation, Vol. 24, No. 2, pp. 335-342, April 1989.
- [2]. R. J. Van Brunt, "Physics and Chemistry of partial discharges and corona", IEEE Trans. on dielectric and Electrical Insulation, Vol. 1, No. 5, pp. 761-784, October 1994.
- [3]. M. G. Danikas, "Some New Relationships and a Scaling Law Regarding Partial Discharges in Spherical Cavities Enclosed in Solid Insulation", Acta Electrotechnica Napocensis, Vol. 39, No. 1, pp. 5-9, 1998.