UNIVERSITY OF WATERLOO

TECHNOLOGY SUMMARY

Laser Technique for the Evaluation of Erosion Resistance of Insulating Materials

Background

Dry band arcing is a phenomenon encountered due to the prolonged exposure of high voltage insulation to wet/polluted environment and it is the principal factor that is responsible for degrading the insulating materials by tracking and erosion. Predicting the lifetime of insulators is therefore important to engineers, and also to the manufacturers of insulating materials.

The conventional ASTM D2303 is an inclined plane test method usually used for evaluating the tracking and erosion resistance of materials by subjecting the materials to a combination of contaminant and voltage. The combination of voltage and contaminant flow-rate leads to continuous occurrence of dry band arcing over the surface of samples, thus simulating the conditions of degradation due to dry band arcing in the field, but in an accelerated way. The test involves a series of steps, including sample preparation, contaminant solution preparation, and monitoring the voltage and contaminant flow rate over a prolonged period of about four hours.

Description of the invention

Researchers at University of Waterloo have been involved in developing new diagnostic techniques to study degradation of insulating materials including laser as a source to study the surface discharge due to dry band arcing. This has led to the development of a new methodology for evaluating insulating materials. Results obtainable by the new laser methodology have been correlated with the electrical discharge damage from standard methods like ASTM D2303, and the comparison was found to be in excellent agreement. The laser methodology offers significant advantages when compared to inclined plane method. It is much faster (36 minutes), simpler, and reproducible. It can be adopted for use in areas relating to quality determination of the final product, as well as in routine testing and evaluating of various compositions for new insulating materials development. Since the entire test only takes a little more than 30 minutes, there is considerable savings to be derived by using this new methodology for practical applications.

Reference

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