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Modification of cable replacement criterion of isothermal relaxation current measurement system

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In order to prevent the failures of underground distribution power cables we need to measure insulation condition in the field. Until now we used DC high voltage as a power source for the cable diagnosis but it was not proper method to the XLPE insulation cables because DC high voltage can affect sound insulation and can't diagnose exactly insulation degradation.

For these reasons we imported Isothermal Relaxation Current(IRC) measurement equipment but it's reliability did not proved in our URD cables. In this paper we tried to prove the reliability of this equipment and to make new replacement criterion for this equipment through the field tests and AC breakdown tests.

In order to prove the reliability of this equipment we select three field installed aged cables of the downtown area in Seoul.

At first, we measured initial condition of these cables using IRC measurement equipment and AC breakdown. And then A and B phase cables were treated by silicone injection and C phase cable did not treated. These cables were operated for 1 year in the field. We carried out cable diagnosis and AC breakdown test at every 6 months.

This paper presents the field test results of this diagnosis equipment and showed the relationship between the results of condition assessment by this equipment and breakdown strength of cables.

Finally we found that the decision criterion of IRC measurement system have to be modified for the economical cable replacement.