### Abstract

By the rapid of urban growth, it is impossible to accommodate the number and size of feeder required for distribution using the overhead line system approach. As an alternative the underground cables becomes more increasingly necessary to replace some of the overhead line for power transmission and distribution. However, the performance of underground cables in service is being critical because of ageing mechanisms influences. There are many suitable techniques can be used to evaluate performance of underground cables. These techniques is based on the data collected by the monitors. This work mainly is a background of some technical method to define the performance of the underground cable.

### Underground Cable Parameters

There are two main types of underground transmission lines currently in use. One type is constructed in a pipe with fluid or gas pumped or circulated through and around the cable in order to manage heat and insulate the cables. The other type is a solid dielectric cable which requires no fluids or gas and is a more recent technological advancement. The common types of underground cable construction include:

- **A. High-pressure, fluid-filled pipe (HPFF)**
- **B. High-pressure, gas-filled pipe (HPGF)**
- **C. Self-contained fluid-filled (SCFF)**
- **D. Solid cable, cross-linked polyethylene (XLPE)**

### Underground Cable Damage

The cause of breakdown in underground cable can be divided into different factors as following:

- **Thermal stress** - Damage to Jacket
- **Mechanical** - Overload
- **Electrical** - Overheat
- **Environment** - High fault Current
- **Environmental** - Operation
- **Electrical characteristics** - of cable

All these factors can damage the insulation, so the insulation is the most important part in the cable. Therefore, studying the impact of these factors in the performance of the underground cable can determine the age of the cable.

### Cable Condition Monitoring Techniques

Many cables are facing the problem of aging. Overtime, the aging can eventually lead to early failure of the cable, which can result in big in loss for society. How to prevent Condition monitoring techniques is the best way to prevent unexpected failures.

#### Commonly Used Cable Condition Monitoring Techniques

- **Screening**
- **Visual Examination**
- **Pass/Fail**
- **Borescope**
- **AC Voltage withstand**
- **Insulation resistance**
- **Hi potential**
- **IR Thermography**
- **Time Domain Reflectometry**

#### The Benefits of Underground Cable Condition Monitoring

- Saving the power industry millions of dollars lost due to line failures and premature replacement of cables.
- Improving cable quality and reliability.
- Extending life time of underground cable by enabling improved cable management through real time condition monitoring and trend prediction.
- Reducing operation cost of cable.
- Estimating the life time of cable insulation.

### Conclusion

Monitoring power system cables is used to evaluate the performance of underground cable and to watch for condition that could required attention as well as to provide an valuable information for utility regarding the age of cable. There are plenty of cable condition monitoring techniques and each has its pros and cons, but we can't carry out all the test every time. Therefore, we are engaged in finding a applicable model or new method, which is more comprehensive and effective, for cable condition monitoring.