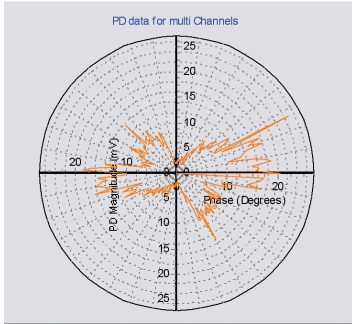


TARGET MAINTENANCE



View of Active Partial Discharge on a dry 45 year old 11kV indoor termination.

By having advanced warning of pending failures, a sound repair methodology can be implemented in a structured and timely manner resulting in significant cost savings.

With sufficient experience and the use of modern On-Line Partial Discharge equipment it is possible to look further into cable networks than ever before.

In a recent assignment at a steam powered turbine generating plant (Queensland Australia) an electrical engineer who had inherited a station full of 11kV paper lead cables with pitch filled terminations, discovered that they all had an average age 45 years.

His task was to identify which 11kV paper lead cable or which termination was at risk of failure. Out of sixty cables tested On-Line, five were found to have established a level of Partial Discharge that would lead to failure if urgent repairs were not undertaken.



An example of what was found once the cable was dug up.

4. Allows for pre-arrangement of suitably qualified cable specialists.
5. Allows for consultation with the cable supplier to ensure correct cable is sourced in a timely manner.
6. Secondary damage due to the primary fault is reduced or eliminated altogether. For example, a failed bushing that explodes inside an enclosure will cause further damage, or a high voltage spike stressing stator winding insulation could ????????
7. On-hand stocks or availability of original spares on equipment no longer exists.
8. Reduced personnel injury to operational staff by ensuring all "best practices" are adopted. This also applies to switchgear.

MAINTENANCE CHANGED

The original cable installation was of a high standard, but due to ownership changes that lead to the plant working harder, planned maintenance was changed to "target" maintenance. (Target Maintenance is the use of On-Line Partial Discharge surveys for cables and DGA sampling for transformers).

The company concerned found this approach for cable management has provided significant advantages such as:

1. Direct cost savings - 6% of cables out of 75 surveyed required immediate maintenance. This has resulted in extensive cost savings. (The original plan was to replace cables by "age").
2. Provides for higher plant availability than ever before.
3. Allows for planned timely replacement and/or repairs rather than forced outages.

PROGRAMMED SURVEYS

On - Line Cable Partial Discharge is now a recommended method of determining the condition of cables and switchgear while it is in-service. The methodology in achieving this is carrying out programmed surveys to establish a trend, and monitor any deterioration that may occur, by carrying out this on line, true in-service conditions are measured, this will ensure a continued reliable operation of these cables.

SUMMARY

Where a change is occurring within the internals of cables or terminations, the location can be found by using On-Line location methods using latest UK technology and a programmed outage can be arranged to fit in with system operational constraints.

By having advanced warning of pending failures, a sound repair methodology can be implemented in a structured and timely manner resulting in significant cost savings. This allows the asset owner sufficient time to source a suitable contractor and suppliers of jointing materials in a timely manner. (Cable jointing is a specialized business, and requires a high skill level and full understanding of cable systems.)

