

06 November 2001

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Ofil Ltd.

Performance of DayCor II

Introduction

STRI has been evaluated the new UV-camera DayCor II from Ofil Ltd for a test period of three months, from April to June 2001. The camera has been used in several testing and research projects – both indoors and outdoors.

Operation of the camera

The camera is easy and almost intuitive to handle. All functions and connections are clearly marked and there seems not to be any risk for serious mistakes.

The low weight of the camera together with the carrying system (i.e. back pack and belt) makes it easy to handle even far away from the laboratory. One inspection has already been performed along a 130 kV power-line.

Detection of corona from sharp edges etc

Discharges from sharp edges, bolts, split-pins etc can be a serious problem in a High-Voltage environment and must therefore be located and reduced. The DayCor II has been used for such applications in several projects and most of the time with successful results.

Measurement of Radio Interference Voltage (RIV) level often results in time consuming localisation of unexpected and unwanted sources for discharges. The new UV-camera has proven to be a useful and reliable tool for detection of such disturbances. The camera is already more or less "standard" equipment at RIV measurements performed in our laboratory.

The detection limit according to the specification of the camera is 100 pC at 50 m distance and according to an EPRI study 30 pC at 6 m distance. The later figure has also been verified by experiments in our laboratory.

During a series of tests with porcelain insulators of cap-and-pin type, discharges from the tip of a split-pin were observed with the camera (see Figure 1). The discharge level was simultaneously measured with an ordinary PD-measuring circuit. The minimum discharge level, visible indoors with DayCor II, was about 5 – 8 pC at 6 m distance.

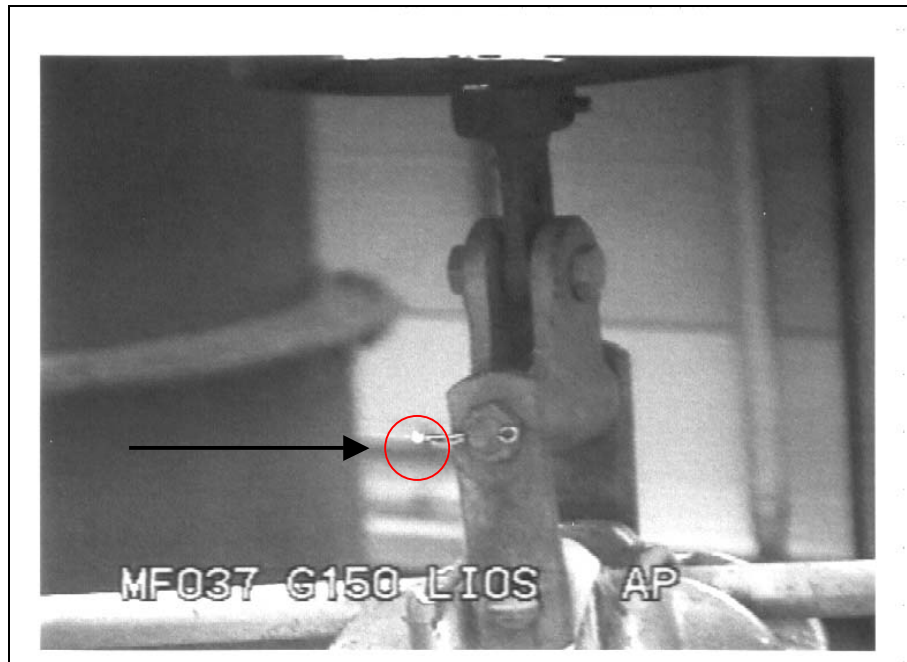


Figure 1. Discharges from the tip of a split pin.

Weak discharges from droplets of water on an insulator surface can also be seen with the camera. An example of this phenomenon is given in Figure 2.

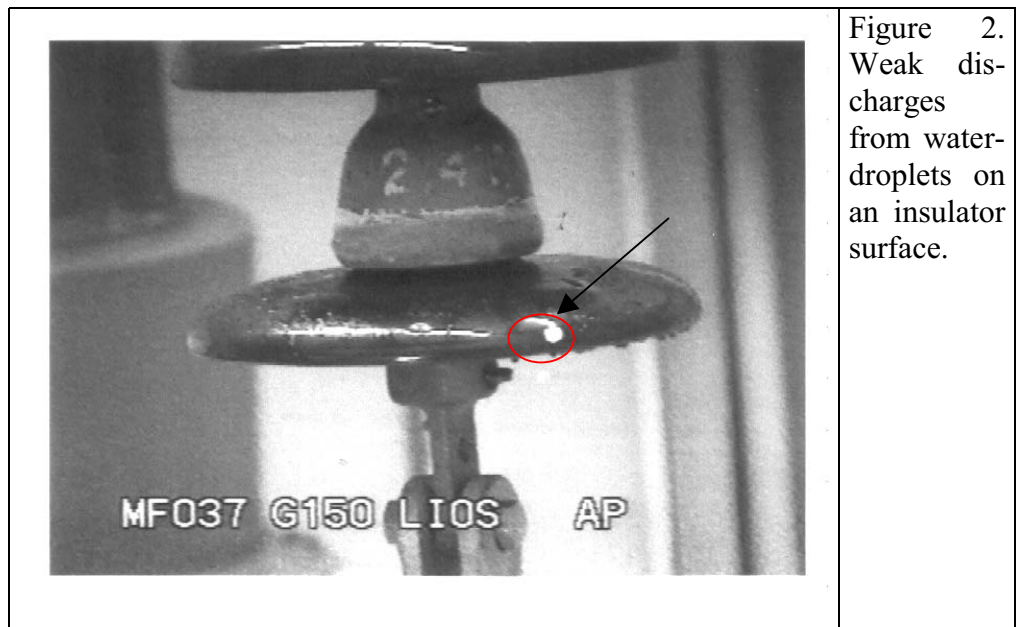
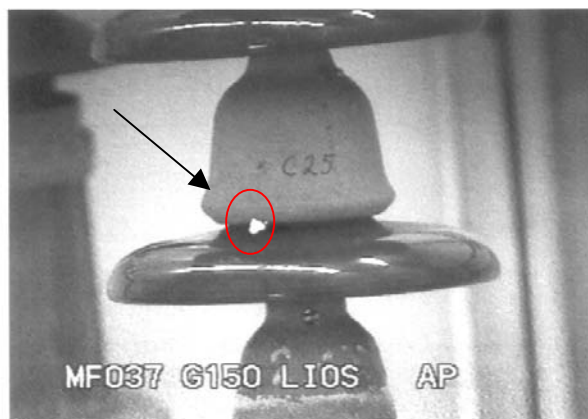


Figure 2. Weak discharges from water-droplets on an insulator surface.

Figure 3, below, gives another example of discharges from an area with high electric field. Discharges of this type may be an indirect indication of short-circuited insulator units in the string.

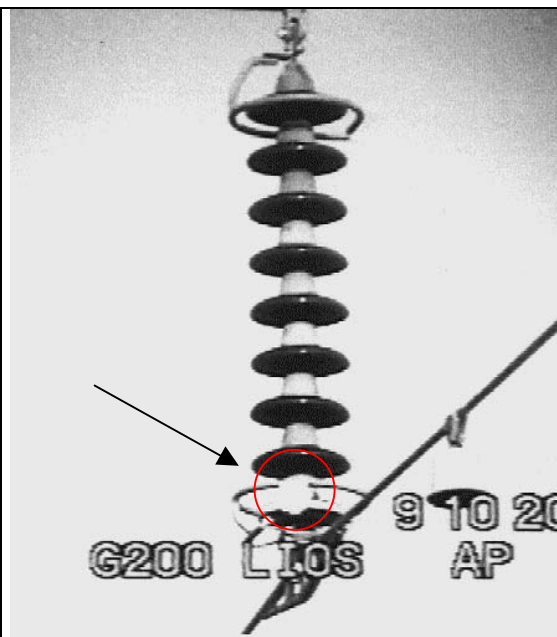
Figure 3. Discharges from the slot between the metal cap and the porcelain. This unit is sound, but this may be an indirect indication of one or more damaged insulator units in the string.



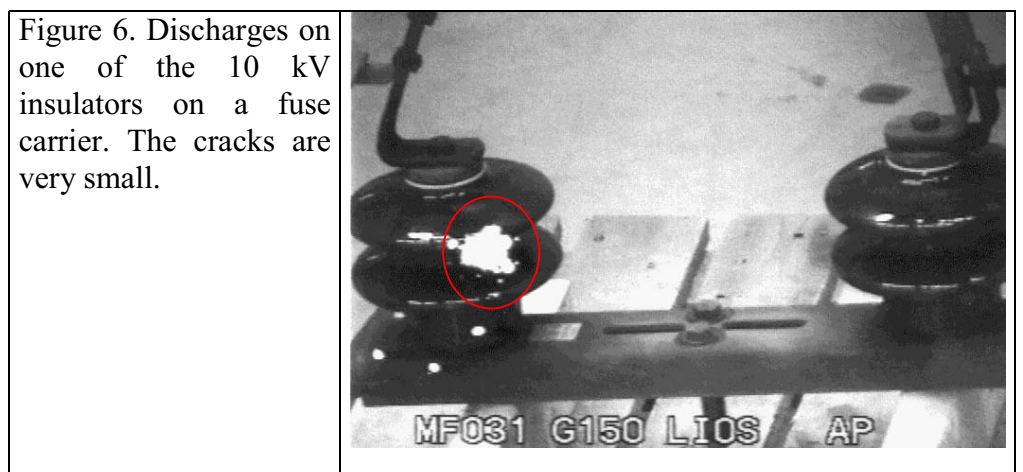
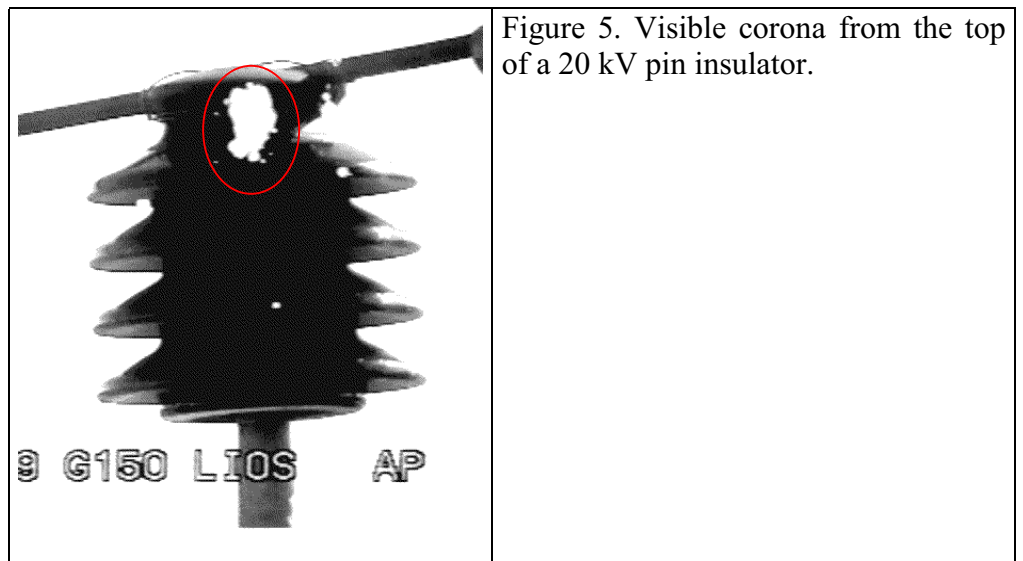
Detection of damaged porcelain insulators

A number of porcelain insulator strings for 130 - 155 kV system voltage have been studied both in the laboratory and outdoors. An example of a weak indication of a damaged insulator can be seen in Figure 4.

Figure 4. UV-photo from a 155 kV line. A weak UV indication from insulator no 9.



The result for 10 & 20 kV system voltage is promising. Insulators with small cracks between high-voltage end and ground can be detected with the UV-camera (Figure 5 and 6.).



Detection of damages on composite products (i.e. insulators, optical fibres etc.)

Preliminary studies indicates that this can be a very interesting area, but our experience is still to limited to present any more detailed information .

Possible improvements of DayCor II

- A new version of the software without any start-up problems.
- A 3/8" connection for a tripod as a complement to the existing 1/4".
- A built-in DSP unit.
- A built-in video capture unit and a digital memory.