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11 kV Feeder - Source Of Tripping Detected

Paul Douglas from Line Scan Services (New Zealand) pinpoints with the DayCor camera the source of tripping of a 11 kV feeder

Paul Douglas' story:

The local power utility was experiencing power black outs on a particular distribution 11kv feeder during the passage of a low pressure weather system crossing the country, with expected heavy rain fall. The first down pour tripped the Circuit Breakers at the National Grid substation into the earth fault position, and the local linesman started their patrols with nothing obvious being found.

They began restorative switching to return power to parts of the city and to sectionalize what was now likely to be a cracked insulator or faulty A.B. Switch. The last section of line was restored and the feeder tripped out again. They then thought the switch could be the problem as it made a strange noise when closed.

One of the line supervisors was aware of me trailing the DayCor corona camera out for detection of these particular types of intermittent faults and notified me. I looked at the A.B. Switch and found nothing abnormal; the next pole along showed excessive corona discharge from a bridging insulator, which I thought, could be the fault. The line tripped another three times over the weekend until it was reported by local residents of sparks coming from a pole. I then had another look with the camera and captured the images of the insulator before being replaced and afterwards. The insulator had a small pinhole in the top where it had been leaking to ground through the pin and concrete pole.

This section of line is the only part of this particular feeder that is constructed in this manner and is approx 30 years old; all other insulators are mounted on x-arms. The first insulator I discovered was also looked at and was found to have a small chip on the second or largest skirt.

Through these discoveries I am now in discussion with a number of New Zealand utilities regarding the use of the camera as a preventative maintenance tool.

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Figure 1: Insulator on 11 kV line with excessive corona



Figure 2: Insulator on 11 kV line with excessive corona



Figure 3: Insulator dissected to show pinhole.