

**Florence, Italy**  
**30<sup>th</sup> September – 2<sup>nd</sup> October 2019**

**(2299)**  
**Trenchless**  
**Technology Case**  
**Studies**

**WRc's Use of**  
**Focused**  
**Electrode Leak**  
**Location (FELL)**  
**to Assess Gravity**  
**Sewers in the UK**  
**and Germany,**  
**Before and After**  
**Rehabilitation**

### **Paper Ref #2299**

#### **WRc's USE OF FOCUSED ELECTRODE LEAK LOCATION (FELL) TO ASSESS GRAVITY SEWERS IN THE UK AND GERMANY, BEFORE AND AFTER REHABILITATION**

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**ABSTRACT:** Since 2015, WRc plc has completed numerous projects utilizing Focused Electrode Leak Location (FELL) to assess gravity mains, before and after rehabilitation, to detect leaks missed by conventional CCTV surveys.

In one example, a major British water company had a problem with infiltration into its gravity sewer network, overwhelming a pumping station to the point where it could not cope with flow, particularly during the wet weather events. Contingency measures (i.e. tankers) had to be put in place, at great expense and disruption. As a result, the services of WRc were engaged to provide a survey of the 150mm diameter pipe using a FELL-based advanced sensor to locate (within 1cm) and quantify defect flows from cracks, bad joints and poorly-made connections.

By introducing electric current into the water using a tethered probe, the locations of infiltration could be identified where the current escapes to earth. The larger the dissipation of current to earth, the larger the defect, allowing Electro Scan technology to detect infiltrations missed by conventional CCTV surveys.

Over a survey length of 600m, Electro Scan detected no less than 63 infiltrations. By comparison, a CCTV survey that was performed simultaneously found just one (1) source of infiltration. Furthermore, Electro Scan discovered that 80% of the infiltration was restricted to three pipe sections. As a result, the water company could line these three sections, rather than the entire 600m pipe run, providing a cost-effective solution to relieving flow on the pumping station and eliminating the need for tanker.

This paper discusses several UK projects and a recent project undertaken for IKT in Germany, describing how low voltage conductivity can:

1. Identify infiltration and prioritize repairs.
2. Test pipes while still in service.
3. Find major defects while other methods may not, i.e. ensure that major defect are not accepted.