

Linear Polarisation Resistance (LPR) Corrosion Rate Monitor



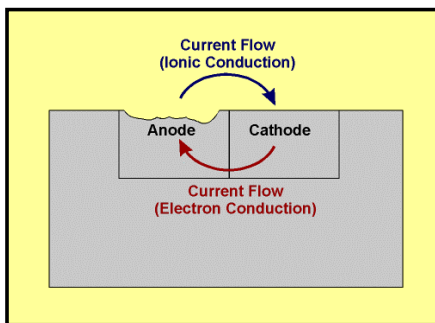
Advanced Engineering Solutions Limited (AESL) offers specialist test and evaluation services for the assessment of corrosion on partially buried steel structures such as pipes, pylons and street lighting columns.



Partially buried steel structures will corrode and with time this can lead to failure of the structure. Additional consequential costs can be significant, particularly where they result in third party claims.

Using the well tried and tested technique of 'linear polarisation resistance' the potential for the initiation of corrosion, and the rate of corrosion can be assessed.

Corrosion is an electrochemical process involving the transfer of electrons from the anode to the cathode as shown below.



The corrosion current is the flow of electrons from the ferrous structure to the soil. Measurement of this current would allow the calculation of the number of metals ions being dissolved (corrosion) and hence the rate of metal loss with time. However, the current cannot be measured directly since on any ferrous surface there are many thousands of microscopic anode/cathode areas. The LPR technique uses an alternative approach.

The corrosion rate is normally determined by equilibrium between the anodic and cathodic reactions. During the anodic reaction, metal is oxidized, releasing electrons into the metal. During the cathodic reaction, a solution species (often O_2 or H^+) is reduced, removing electrons from the metal. When these two reactions are in equilibrium, the flow of electrons from each is balanced, and no net electron flow (electrical current) occurs. Moving the potential a few mV either side of this balance creates a flow of electrons and the current v potential can be measured. Plotting a graph of absolute current v potential allows the intercept of the graph to be calculated and translated by the software to predict the corrosion rate and hence metal loss with time.

The LPR equipment is shown below:



The instrument is:

- Portable
- One man operation
- Fast and easy to use on site
- Reliable and robust
- Uses GPS technology for location
- Software driven with data storage

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