

LIMITATIONS OF CATHODIC PROTECTION SYSTEMS IN TERMS OF POLARISED POTENTIALS. - an Alternative Electrical Perspective

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Abstract

There is a little known, and even less understood, statement in Baeckman & Schwenk^[1] on page 556: " The protected length can thus only be increased insignificantly" (referring to the effect of increased overprotection)

Many engineers and infrastructure operators struggle with the concept that one cannot just "turn up the wick" to achieve a greater degree of cathodic protection, either in terms of polarised potentials or the effective spread from an existing impressed current cathodic protection (ICCP) installation. This is particularly true for ageing infrastructure where current density requirements increase with time.

An ICCP system has many parallels from an electrical perspective with a conventional lead-acid battery system. This is something that most technical people who have owned or operated a motor vehicle can relate to. By using the various parameters of a vehicle electrical system it is possible to illustrate the characteristics of an ICCP system in a way which engineers with little or no corrosion training can understand.

For example, the polarisation limit ($-1150\text{mV}_{\text{Cu}/\text{CuSO}_4}$) can be likened to the voltage of a fully charged battery (13.8V).

This paper will illustrate the equivalent electrical circuit of an ICCP system in terms of a lead-acid battery and provide the reader with simple table of comparisons which will do much to facilitate the understanding of this complex subject.

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[1] Handbook of Cathodic Corrosion Protection
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