Coupon Effects on IR free Potential

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Abstract

Coupons are widely used in the assessment of cathodic protection efficiency – in particular for the establishment of an IR free potential. Coupons can be individually switched off in the test posts and the instant off measurement is applied to determine the IR free potential.

One question is repeatedly debated in the CP society; - the ability of a coupon to be representative of a coating defect on the pipeline itself. This paper discusses results from a series of experiments made in a 5-meter long soil box equipped with 8 coupons of different size and shape; hence 8 difference spread resistances. These coupons were polarised using a common rectifier. Individual switches as well as a common switch allowed for establishment of the individual IR free potentials as well as a common IR free potential. In the real pipeline scenario this setup mimics the capability to compare coupon IR free potentials with the mixed IR free potential measured on the pipeline scale and established as a result of a mixture of different coating defects.

Did the coupon IR free potentials differ significantly from each other and from the common pipe to soil IR free potential? Was the common pipe to soil IR free potential represented by the IR free potentials of the coupons? Were the coupons representative of the pipeline? Was the common pipeline IR free potential representative of the coating defects existing in the pipeline? Was the pipeline representative of the pipeline when it comes to cathodic protection efficiency? These questions are debated for cathodic protection and DC interference conditions based on the experimental results as well as computer modelling.