

ACCURATE PREDICTION OF CAST IRON WATERMAIN PERFORMANCE USING LINEAR POLARISATION RESISTANCE (LPR) METHODOLOGY

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ABSTRACT

The theoretical basis of Linear Polarisation Resistance (LPR) as applied to soil corrosivity assessments is described, together with reference to other commercially available condition assessment techniques. The use of resistance polarisation results (R_p) as input to extreme value statistics (EVS) models in order to obtain a prediction of deepest pit depth is outlined. The use of this output parameter as a key input to the algorithms which generate probability curves is also described and the use of these curves to finally predict time to next failure(s) for each discrete pipeline explained.

A case study is presented of a trial condition assessment study for Hunter Water Corporation, NSW, in which six (6) DN 500 CICL watermains of varying ages were subjected to LPR based analysis. The pre-existing failure record of these pipelines was not disclosed, assuring all steps in the assessment process were conducted 'blind'.

Results of the prediction on each pipeline was compared with actual performance data. In all cases, the LPR based modelling was successful in predicting outcome on a fail/not fail basis, whilst the relative level of performance was also successfully predicted by the algorithms used. In two cases the model was slightly conservative on measuring performance, perhaps influenced by the presence of backfill contamination.

The results of this trial indicate that the LPR technique is a cost-effective and proven method of predicting pipe performance under a wide range of soil conditions.

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