

# EXTERNAL CORROSION OF BURIED IRON AND STEEL WATER MAINS

P.H. Ferguson, Tubemakers of Australia,  
D.M.F. Nicholas, Hunter Water Board

## SUMMARY

The corrosion of buried unprotected ferrous pipes occurs at vastly different rates in different environments. Along with the natural soil environment, other important influences, such as the presence of stray current or bi-metallic couples, will affect the rate of pitting corrosion. Accordingly, underground corrosion is defined as intrinsic or extrinsic, depending on the source of major influence of the corrosion process. These extrinsic and intrinsic categories are listed, and an indication of the rates of corrosion based on field experience that can be expected in the various environments are provided, with specific reference to the water industry.

Corrosion mechanisms are presented, with reference to the substantial data bank of exhumed pipe. It is proposed that the major intrinsic soil corrosion processes occur due to either the activity of anaerobic bacteria or localised differential aeration cells.

The use of Linear Polarisation Resistance (LPR) techniques in predicting corrosion rates of ferrous materials is briefly reviewed. A computer-aided LPR – derivative method of assessing soil corrosivity has been investigated, and some initially encouraging results are presented.

*Paper presented at Australasian Corrosion Association Conference, Sydney 1991*

*Reproduced for Corrosion Australasia, Vol.17, No.4*