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基于小波分析和神经网络的埋地管道防护层现场检测与评价方法

高志明, 宋诗哲, 王守琰, 陈世利, 赖广森

天津大学材料学院;天津大学精仪学院，天津 300072;金属腐蚀与防护国家重点实验室，辽宁 沈阳 110016

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摘要 应用密间隔电位（CIPS）和恒电流瞬态响应技术对埋地管道防护层进行现场测试. 以密间隔电位（CIPS）小波变换方法对防护层进行初步检测，分别对通电电位、断电电位和二者之差进行分析，将三者的第3层小波概貌之积和小波细节之积为二次信息，所得信息突出了缺陷点的位置. 建立恒电流瞬态响应小波神经网络对防护层状态进行识别，结合了小波多分辨分析和Kohonen神经网络的特点，不需对含噪声的恒电流瞬态响应信号进行滤波处理，直接将信号输入小波神经网络，实现对防护层剥离、完好和破损状态的判断.

关键词 CIPS 恒电流瞬态响应 小波神经网络 埋地管道 防护层

分类号

ON-THE-SPOT DETECTION AND EVALUATION METHOD OF UNDERGROUND PIPELINE COATINGS BASED ON WAVELET ANALYSIS AND NEURAL NETWORK

GAO Zhiming,SONG Shizhe,WANG Shouyan,CHEN Shili,LAI Guangsen

Abstract

The close interval pipe-to-soil potential survey(CIPS)and the galvanostatic transient response method were used to detect the coating quality of buried pipelines.An algorithm was presented based on the dyadic wavelet transform for detecting the pipeline coating damage point with the ON and instant OFF CIPS potential and the difference between them.A six-layer wavelet Kohonen neural network model was set up to diagnosis the quality of pipeline coating with the galvanostatic transient response.The first to fifith layers of the model were used to pick up the information, and the last layer of the model was capable of self-training.The coating quality could be diagnosed quickly after the galvanostatic transient response was input to the model. The detection result of pipeline between Dagang and Cangzhou of Tianjin Dagang oil field was satisfactory.

Key words

close interval pipe-to-soil potential survey galvanostatic transient response wavelet neural network pipeline coating

DOI:

通讯作者 宋诗哲 szsong@tju.edu.cn