

论文

管线腐蚀与防护势态的灰色评估研究

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摘要:

分析了影响输油管线防护状态的4项因子即管地电位、阴极保护电位、土壤中碳钢腐蚀电流密度以及防腐层电阻的统计分布特征,发现它们分别服从正态分布或对数正态分布;且新旧两条输油管线的管地电位与防腐层绝缘电阻的均值与方差具有显著性差异,而土壤腐蚀电流密度与阴极保护电位则不构成显著差异.应用灰色决策(灰靶)理论对管线综合势态和运行风险进行了分级和评估,为减少管道腐蚀事故和管道的预防性维修提供依据.

关键词: 输油管线 统计分析 灰色评估

GREY ASSESS AND STATISTIC ANALYSIS OF CORROSION STATUS OF LONG-DISTANCE OIL PIPELINE

Abstract:

Most underground long-distance oil pipelines have overrun the designed lifetime presently. Therefore, hazard estimation and prediction of aged pipelines is more imperative than before. In the present paper, mathematical statistical analyses and sample distribution assumption test of four factors i.e. Pipe-Earth Potential (ϕ_{PE}), Cathodically Protected Potential (ϕ_{CP}), Corrosion Current Density (i_{soil}) of steel (16Mn steel) in soil and Coating Resistance (R_{coat}) were accomplished, the results characterized good reliability and correlation between them and the protection status of pipeline. Furthermore, the i_{soil} and ϕ_{CP} had same distribution in either new pipeline or old pipeline. In contrast, the ϕ_{PE} and R_{coat} were submitted to different distribution. Then, a gray target identification model was used to assess and classify the comprehensive corrosion and protection status of the oil pipeline. The result indicated the classification is useful to the preventive repair on pipeline.

Keywords: oil pipeline gray target identification hazard assessment corrosion invalidation

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