

城市地下燃气管网泄漏定位研究

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摘要:

由于城市燃气管网泄漏极具危险性,而现有的检测定位手段不能有效的对泄漏点准确及时的发现与定位。本文根据互双谱延时估计理论,将双谱应用于地下中压燃气管网泄漏的定位,通过直接法得到互双谱和自双谱的估计值,由该估计值得到双谱的相位,为了得到真正意义相位,对估计相位进行了解卷绕,得到最小二乘意义上的无卷绕相位,最后由互双谱和自双谱的无卷绕的相位差得到泄漏点的位置,并通过大量的泄漏定位实验证明了该方法的有效性。实验结果表明,该方法应用于城市中、低压管网的泄漏定位,在检测距离为30m的情况下,定位绝对误差小于2m

关键词: 互双谱 地下燃气管网 泄漏定位 双谱相位解卷绕

Leakage location of the urban underground natural gas pipeline

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Abstract:

Rapidly development of the natural gas pipeline and its dangerous leakage, especially those buried under cities, it is necessary to find and locate the leakage timely and exactly. This paper applied phase difference between cross bispectrum and auto bispectrum which derived from direct method to locate leakage of the underground pipeline. In order to get the true phase difference, least-square bispectrum phase unwrapping algorithm form from the modulo bispectrum phase was involved. Two piezoelectric accelerometers and 40m coating steel pipe were used in course of practice. Plentiful experiments verified practicality and validity. Experimental results show that the location errors less than 2m at 30m.

Keywords: Cross bispectrum; underground gas pipeline; leakage location; bispectrum phase unwrapping

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