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A new leak location method based on leakage acoustic waves for oil and gas pipelines

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In order to study a new leak detection and location method for oil and natural gas pipelines based on acoustic waves, the propagation model is established and modified. Firstly, the propagation law in theory is obtained by analyzing the damping impact factors which cause the attenuation. Then, the dominant-energy frequencies bands of leakage acoustic waves are obtained through experiments by wavelet transform analysis. Thirdly, the actual propagation model is modified by the correction factor based on the dominant-energy frequency bands. Then a new leak detection and location method is proposed based on the propagation law which is validated by the experiments for oil pipelines. Finally, the conclusions and the method are applied to the gas pipelines in experiments. The results indicate that the modified propagation model can be established by the experimental method; the new leak location method is effective and can be applied to both oil and gas pipelines and it has advantages over the traditional location method based on the velocity and the time difference. Conclusions can be drawn that the new leak detection and location method can effectively and accurately detect and locate the leakages in oil and natural gas pipelines.

Biography

Cuiwei Liu is currently pursuing his PhD in Oil and Gas Storage and Transportation Engineering from China University of Petroleum. His research emphases include leak detection and location for oil and gas pipelines based on acoustic waves and dynamic pressure waves.

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