

## **The Propagation of Torsional Guided Wave in Oil-Filled and Viscoelastic Coating Pipe Surrounded by Water**

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### **Summary**

Recently, a technology named ultrasonic guided wave has a rapid development and wide application. It is more and more popular for the advantage compared with traditional detection. An enormous amount of work has contributed to our current understanding of wave propagation. The case of a hollow cylinder loaded by the outside liquid has been considered by Rose et al. Kwun investigated the propagation of guided waves in water filled pipes. C. Aristegui discussed propagation of guided waves in fluid-filled pipe surrounded by different fluids. Lafleur and Shields have studied the propagation of low frequency modes in a liquid-filled tube.

In this paper, the propagation of torsional guided wave in oil-filled and viscoelastic coating pipes surrounded with water loading has been investigated by numerical and experimental analysis. It is essential to understand how the guided waves travel in bent pipes in order to monitor/inspect their health status. Firstly, the paper describes dispersion characteristics for torsional wave by dispersion curves. Secondly, checks up the result of numerical analysis by a series of experimental study. And the effects of viscoelastic material on dispersion of guided wave have been elaborated without considering the shear action because the effect of oil and water are neglected. The result presented in this paper is useful for designing damage detection schemes of pipe-like structures.

