

## **Evaluation of Wall Thinned Pipe Using PVDF Comb Transducer**

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### **Summary**

PVDF comb transducer is low price, easy to fabricate. Because FPCB(Flexible Printed Circuit Board) is used for fabrication of transducer, this can be fully contact with curved surface of testing material. It is possible to generate and detect single mode of guided wave provided FPCB has a shape of comb. This transducer is attached permanently to structures for condition monitoring due to these advantages. This study has been conducted to evaluate the mode characteristic of guided wave in the cylindrical pipe with and without wall thinning defect. The finite element analysis about wall thinned model has been carried out before experiment. In the finite element analysis of ultrasound, the number of element is the most important for reliable result. The higher frequency of interest in the analysis, the more number of elements is usual. It is difficult to simulate the wall thinned model of pipe in 3D due to the limit of computer performance. The PVDF comb transducer used was not fabricated to generate axisymmetric wave in pipe and the specimens used in this study are not long enough to form axisymmetric wave. Wave propagation in this condition can be regarded as waves in a plate. Therefore, the FEA has been conducted for a plate instead of hollow cylinder under plane strain condition. The Experiment for wall thinned pipe was carried out in the corresponding condition to FEA. The experimental result has a good agreement with numerical analysis result. The wave velocity changes as the thickness of wall thinned pipe is thinner.

