



# Guest Editorial

## Special Issue on the Nondestructive Evaluation of Pipeline and Vessel Structures

This special issue of the journal is dedicated to some contemporary aspects of nondestructive evaluation applied to pipeline and vessel structures. This critical area of research, development, and application of nondestructive evaluation is essential from both a safety and economic point of view. We must avoid catastrophic failure and vessel leakage. We must also develop an appropriate maintenance, repair, and replacement strategy, as well as incorporate inspectability aspects into new vessel material development and design.

All of these papers presented here have content that can potentially lead to significant safety and cost benefits to the pipeline and vessel industry.

Some of the papers were presented at the 2003 ASME Pressure Vessel and Piping Conference in Cleveland, the 2003 ASME Off-shore Mechanics and Arctic Engineering Conference in Cancun, Mexico, and the 2004 ASME International Pipeline Conference in Calgary, Alberta, Canada, and, after review, were held to make this special issue.

The first set of papers in this issue can be categorized as general with topics such as acoustic microscopy, ultrasonic properties of polyethylene materials, a sonic pressure vessel sensor, an acoustic emission condition monitoring system for power plant inspection, automated ultrasonic inspection, a technique for corrosion damage in risers, and an interesting approach to corrosion damage in steel reinforced mortar using waveguides. A paper on the time of flight diffraction for crack life defects in vessels is also included.

The next set of papers is on pipeline inspection by a variety of different techniques. These include remote field eddy current, magnetic flux leakage, a magnetostrictive technique, gas-coupled ultrasonics for thickness measurement, neural nets applied to guided wave data, guided waves for mechanical dent detection, a natural focusing technique via partial loading around the circumference of a pipe, and two papers on phased array focusing for long-range ultrasonic guided wave inspection. Two papers address the problem of bends and elbows associated with guided wave inspection of pipe.

Finally, a paper on the academic potential similarities of plate and pipe is then addressed followed by two papers on bulk wave phased array techniques. One is on aspects of a newly developed two-dimensional phased array technique. The second is on a review of linear phased array techniques for pipe and vessel inspection.

Thanks are given to Dr. Sam Zamrik and Diane Bierly who made this special issue possible. Also, special thanks to Kelly Owens for all of her help in soliciting papers, organization, and keeping track of submissions, reviews, rebuttals, and follow ups.

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