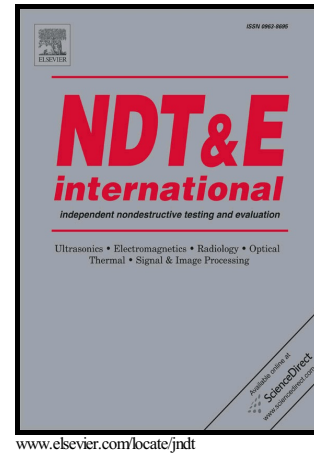


EMAT pipe inspection technique using higher mode torsional guided wave T(0,2)

Nurmalia, N. Nakamura, H. Ogi, M. Hirao



PII: S0963-8695(17)30047-6
DOI: <http://dx.doi.org/10.1016/j.ndteint.2017.01.009>
Reference: JNDT1837

To appear in: *NDT and E International*

Received date: 27 September 2015
Revised date: 12 January 2017
Accepted date: 23 January 2017

Cite this article as: Nurmalia, N. Nakamura, H. Ogi and M. Hirao, EMAT pipe inspection technique using higher mode torsional guided wave T(0,2), *NDT and E International*, <http://dx.doi.org/10.1016/j.ndteint.2017.01.009>

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting galley proof before it is published in its final citable form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

EMAT pipe inspection technique using higher mode torsional guided wave $T(0,2)$

Nurmalia¹, N. Nakamura^{*}, H. Ogi, and M. Hirao

Graduate School of Engineering Science, Osaka University, Toyonaka, Osaka 560-8531, Japan

^{*}Corresponding author: nobutomo@me.es.osaka-u.ac.jp

Abstract

We developed a pitch-catch system based on electromagnetic acoustic transducers (EMATs) for pipe inspection, which moves inside the pipe in the axial direction. The first higher mode, $T(0,2)$, of the torsional guided wave is transmitted and detected, and variations of amplitude and phase are measured while moving the EMATs. Several aluminum pipes containing dish-shaped defects are inspected, and the amplitude and phase show enough detection sensitivity. It is found that the phase measurement has better potential as a tool for quantitative inspection. The applicability of the technique for steel pipe is also confirmed.

Keywords

EMAT, Torsional guided wave, Pipe inspection, Phase, Mode conversion

1. Introduction

Pipes are critical components in infrastructure such as in petrochemical plants, oil and gas transportations, and public service installations. Pipelines often transport highly pressurized and flammable materials, where any failure could lead to a disaster. Integrity of the pipe must be carefully monitored and inspected regularly. Available methods for nondestructive pipe inspection can be classified into magnetic flux leakage [1, 2], eddy current [3, 4], x-ray radiography [5, 6], and ultrasonic [7, 8], in addition to visual inspection. The ultrasonic method using guided waves is superior over the others for its ability to inspect the whole-wall thickness and wide area in a short time.

¹ Present address: Department of Engineering Physics, Bandung Institute of Technology, Bandung 40132, Indonesia

Download English Version:

<https://daneshyari.com/en/article/4925217>

Download Persian Version:

<https://daneshyari.com/article/4925217>

[Daneshyari.com](https://daneshyari.com)