

Pipeline Flaw Detection

Purpose: To inspect aging gas lines that are developing stress corrosion cracking (SCC)
To detect flaws and analyze results in one pass with a noncontact Electromagnetic Acoustic Transducer (EMAT) and wavelet analysis

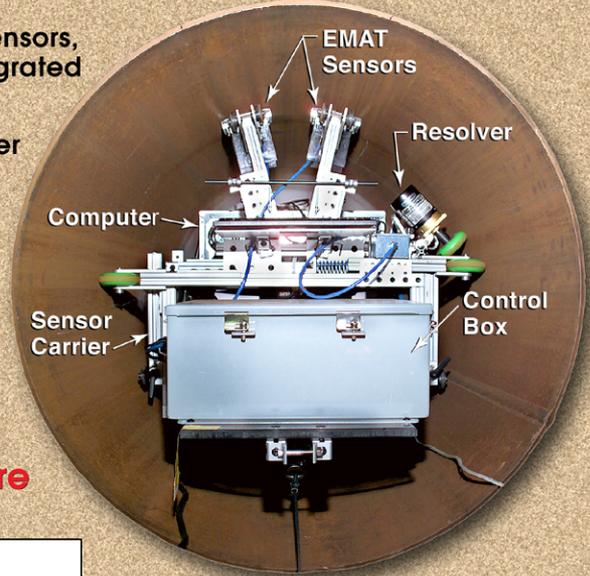
ORNL EMAT System

- Mainly focusing on SCC detection
- ORNL's test pipe inspection system has all sensors, computer, and data acquisition on one integrated unit except for power supply
- Current sensors developed for large-diameter (30-inch) pipes
- Uses Guided Shear Wave EMAT in Sh_1 mode
- Uses wavelets for signal processing

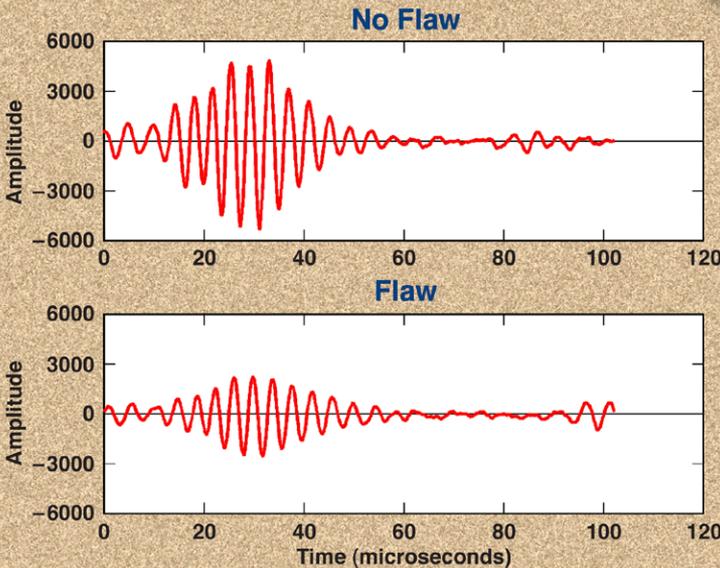


Example of a Stress-Corrosion Crack

ORNL's Test Pipe Inspection System in a 30-inch Pipe



Flaw and No-Flaw EMAT Signature



- The challenge is to distinguish between the "flaw" and "no flaw" signatures
- The upper signature is from a good section of pipe
- The lower signature is indicative of SCC

Goals and Accomplishments

EMAT system designed for classifying flaws in 30-inch natural gas pipeline

Wavelet analysis used to classify flaw and no-flaw for all flaw types

Measurement of actual SCC depth is being used to help characterize the defects



Funded by the U.S. Department of Energy, Office of Fossil Energy,
National Energy Technology Laboratory (NETL)

OAK RIDGE NATIONAL LABORATORY

