Nonmetallic Joint Quality Assessment

DOT Prj#217

Contract Number: DTPH56-07-T-000001

The approach to this project is to develop ultrasonic techniques to inspect butt and other types of fusion joints. The ultrasonic techniques should meet a few criteria to be acceptable to the gas industry. The criteria for a practical ultrasonic inspection method include:

- To be cost effective, the operators who make the joints should also inspect them. As these operators are not trained in ultrasonics, the technique should require little or no ultrasonic expertise to obtain a valid inspection of a joint.
- A large variety of non-metallic pipe materials, pipe diameters, and wall thicknesses are currently being used in gas distribution systems. In addition, the industry is developing new materials and pipe geometries to improve lifetimes and reduce costs. Thus, the cost to develop good/bad joint discrimination parameters for each material and pipe geometry must be low.
- The inspection method must be inexpensive.

GTI has developed a good joint/bad joint discrimination technique that utilizes the geometry and physical properties of the pipe and butt fusion joint in a manner that is easy to adapt to other PE materials, pipe diameters, and wall thicknesses. The number of fusion joints required to be tested is small and hence, the cost of adaption of the technique to a new pipe material is low. A pair of sensors is placed across the joint. Under the software control, the hardware collects and digitizes the data. Next, the software opens the digital files, applies the discrimination technique, determines if that portion of the joint is good or bad, and displays a pass/fail assessment. It is not necessary for the operator to look at the waveform and make any interpretations. GTI is in the process of applying this approach to electrofusion couplings and fittings