PIPELINE DAMAGE PREVENTION THROUGH THE USE OF LOCATABLE MAGNETIC PLASTIC PIPE WITH A UNIVERSAL LOCATOR

SECOND QUARTERLY STATUS REPORT

Principal Investigator: Michael M. Mamoun

847-768-0953, mike.mamoun@gastechnology.org

Report Issue Date: February 1, 2004

DOT Contract OTA DTRS56-02-T-0006

Submitted by

Gas Technology Institute
1700 South Mount Prospect Road
Des Plaines, Illinois 60018

GTI Project Number: 61161/30802-63

Submitted to

U.S. Department of Transportation
Research and Special Programs Administration
Office of Contracts and Procurements, DMA-30
400 7th Street, S.W., Room 7104
Washington, D.C. 20590-0001

RESULTS AND CONCLUSIONS

A large number of laboratory experiments were performed during the current period. These experiments provided very significant and useful data, results, and information. A few of the results are summarized as follows.

1. The field strengths currently obtained from the pulse magnetizer are comparable to those achieved with the Permanent Magnetizer.
2. The magnetic field strength of test pipe specimens increases with increasing specimen length and attains an asymptotic maximum value for a specimen length of about 60-inch.
3. To correlate the magnetic field strength of laboratory test specimens with the field strength of field-installed long pipes, the laboratory test specimens should be no less than about 60-inch long.
4. The magnetic field resultant of the transversely magnetized 24% pipes is of a magnitude of about 2300nT.
5. Re-magnetizing the transversely magnetized pipes, using the "Permanent Magnet" did not cause any significant increase or decrease in the magnetic field resultant.
6. Axial magnetization experiments indicate that the greatest magnetic field is generated with induced dipoles that are aligned (N-S) and non-overlapping.
7. Axial magnetization experiments on pipe specimens that are 12- to 18-inch long showed that the resultant magnetic field is about 550nT for induced aligned pairs of dipoles separated by a distance of about 1.5 inches.

The laboratory test results led to several conclusions, namely:

1. Additional experiments should be conducted on the transversely magnetized pipes, using "Permanent Magnets" having greater field than 6500 G (0.650T) to determine unequivocally whether or not maximum magnetic saturation levels were attained.
2. Additional axial magnetization experiments should be conducted to determine optimum spacing for the axially induced pairs of aligned dipoles and to determine the effect of specimen length on the resultant field.

WORK PLANNED FOR THE NEXT REPORTING PERIOD

The following work tasks are planned for the next reporting period.

1. Conduct experiments using IMI “Permanent Magnets” to evaluate magnetic saturation levels for the transversely magnetized pipes.
2. Perform additional axial magnetization experiments to identify optimum spacing of dipole pairs and number.
3. Perform laboratory experiments using compression-molded plaques to simulate strip magnetization or a co-extruded magnetic layer.
4. Manufacture test pipe with lower particle concentration and conduct laboratory tests and measurements of the magnetic field.