Pipeline Current Mapper
PCM+

locate | measure | store | upload | review | analyze
The PCM can....

- Find contacts with other structures
- Evaluate Pipe Coating for defects
- Perform periodic Pipeline surveys
- Find defective Insulation joints
What is different about PCM

• High output power Transmitter

• Low Frequency signal

• Current Direction of applied signal

• Data logging of current measurements

• A Frame pinpointing of coating holidays
Benefits of low frequency Radiodetection

AC Tx

Test point

DC 4Hz 1KHz

Signal strength (dBmA)

Distance

PCM
Benefits of low frequency

1A (4Hz)
1A (1KHz)

40mA
400mA

900mA
600mA
960mA

200mA
60mA

fault

PCM
The Transmitter utilises..

- High output power (150W)
- Very low frequency
- This helps to:
  - Increase range
  - Reduce coupling to other services
  - Reduce field distortion
The Transmitter

• Can be powered from…
  ✴ 110/240Vac
  ✴ The D.C output of a rectifier (20 to 50vD.C)
  ✴ External Automotive batteries (24v to 48V)
PCM Receiver provides...

- Pipe location and depth
- Current measurement of survey current
- Stores up to 999 readings for download to a PC or PDA
Transmitter connection

• Typical rectifier installation.
• Provides a perfect pipe connection point
• Anode provides perfect ground connection point
Transmitter Connection

- Disconnect the rectifier output from both pipe and Anode
- Connect the PCM transmitter in place of the rectifier
Setting the Transmitter

• Three output settings

- 4Hz and 98Hz
- 4Hz, 8Hz and 98Hz
- 4Hz, 8Hz and 512Hz
Setting the Transmitter

- Set Current switch to desired current
- The PCM transmitter is a constant current source, this ensures stable survey readings.
Taking current reading

- Ensure both PCM receiver is set to the same frequency as the Transmitter
- Pinpoint the pipe in the peak Mode
Taking Current Readings

- Hold the Receiver Steady on the ground, press and hold the PCM Key.
- Current is displayed after approximately 3 seconds.
PCM current v Line Drops

LINEAR COMPARISONS

Data obtained during comparative tests on site
Current Direction

- This tells you in which direction the Current is flowing
  - Aids fault analysis
Datalogging

- 999 readings can be stored
- Stored readings can be reviewed on PCM+ or downloaded to PC
- Downloaded files are in text format and can be displayed using Excel or 123 spreadsheets
Pinpointing Coating Defects

- For accurate coating defect location use the A Frame
Finding Coating Defects

Transmitter

A-Frame
Case Histories
Defects found by PCM
Cut away ready for repair
Close up view of cutaway showing area of metal loss
Cables in contact with pipe
Sheet pile in contact with pipe
Current Attenuation Graph

Actual PCM Results

3 steps are different looking in mA but nearly identical in dB
AC Voltage Gradient

• Can be part of Current tools
• Becoming very popular
• Extreme sensitivity
• Rejection of interference
• Very accurate location of faults
  – typically better than 6"
• Sometimes part of Current Attenuation equipment
• This method deserves to be considered as a solid tool for integrity and the ECDA process.
ACVG in Operation

- Both signal strength and direction arrows lead user to holiday.
- Fault value is proportional to holiday size and soil resistivity.
Pool of Potential

Is AC, but at any instant in time, there is a direction.
ACVG Tuning

- Older systems used a simple DMM
  - Does not tune to any one frequency
  - 60 Hz, cable earth faults, telecom noise
  Rx’d

- Very tight tuning in the signal generator and receiver effectively increases sensitivity as it ignores current from other sources
  - SNR improves
• In this case the next fault was quite close (20-30m) which is why the left side of graph climbs quickly.
• Other cases may show 100s of meters of signal at 30 and under..
Dig Pictures