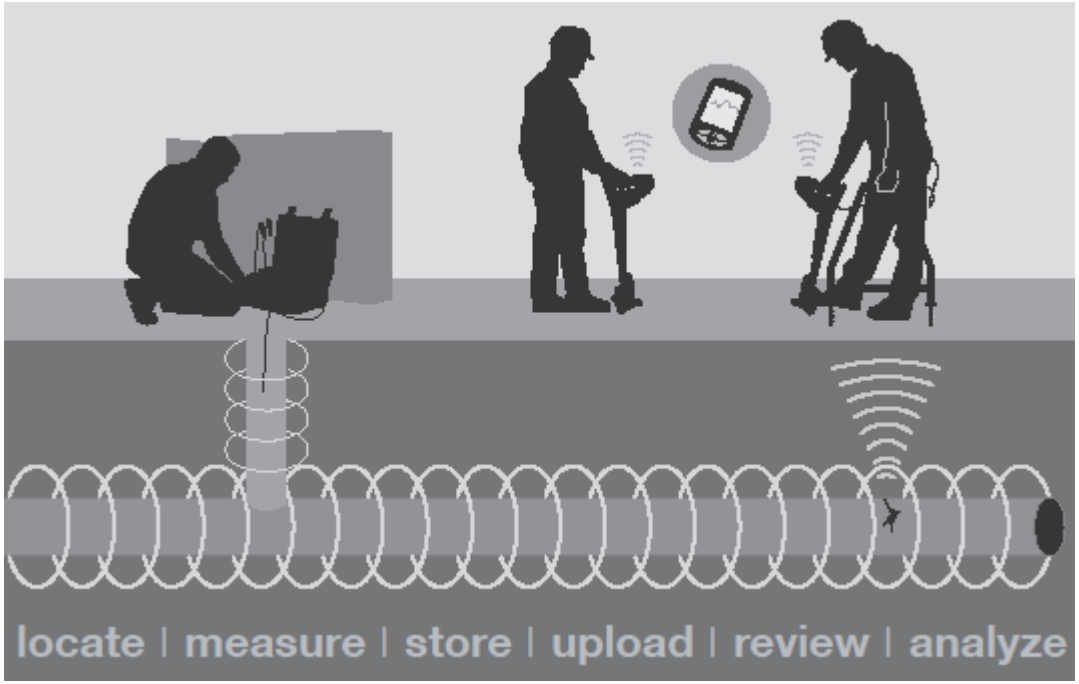
Pipeline Current Mapper
PCM+



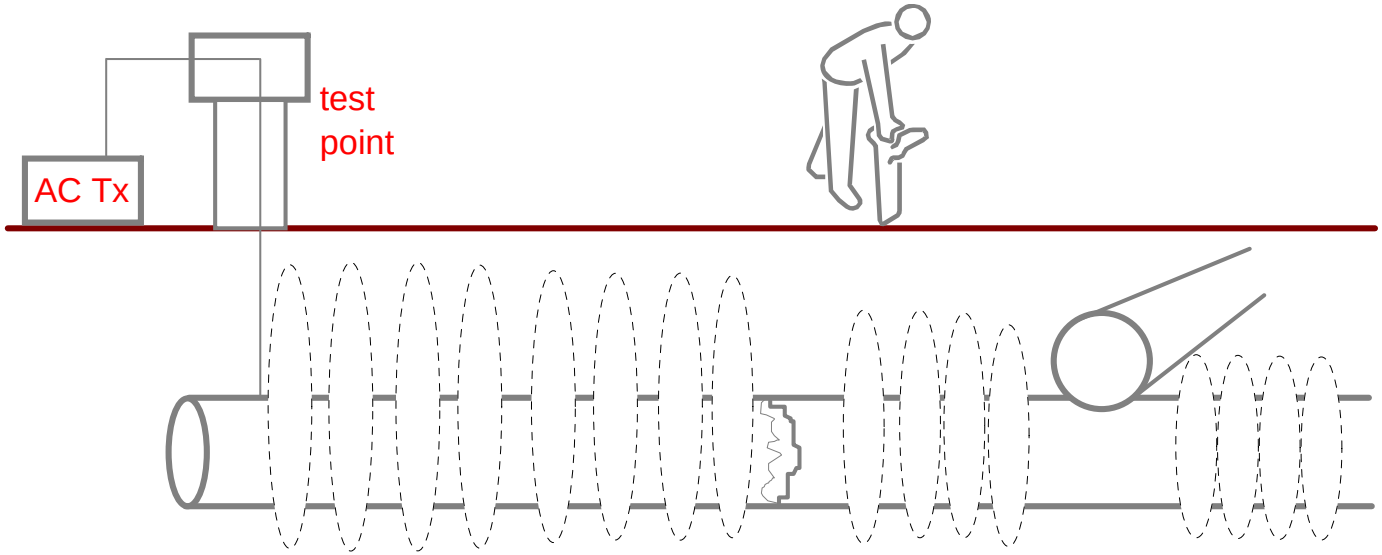
The PCM can….

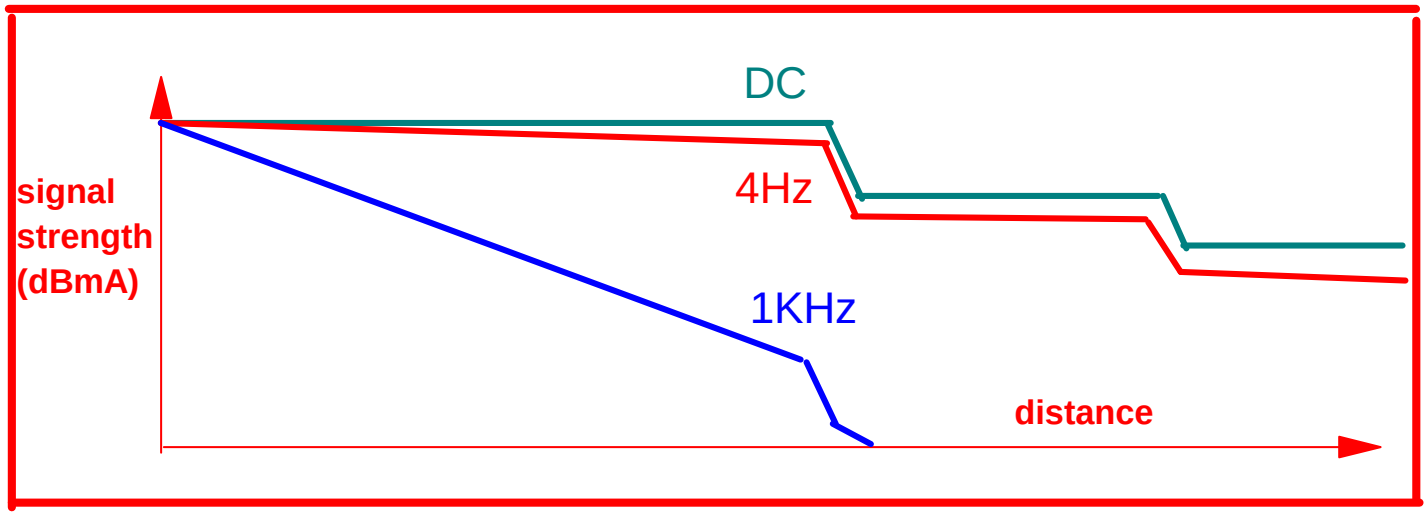
- Find contacts with other structures
- Evaluate Pipe Coating for defects
- Perform periodic Pipeline surveys
- Find defective Insulation joints

What is different about PCM

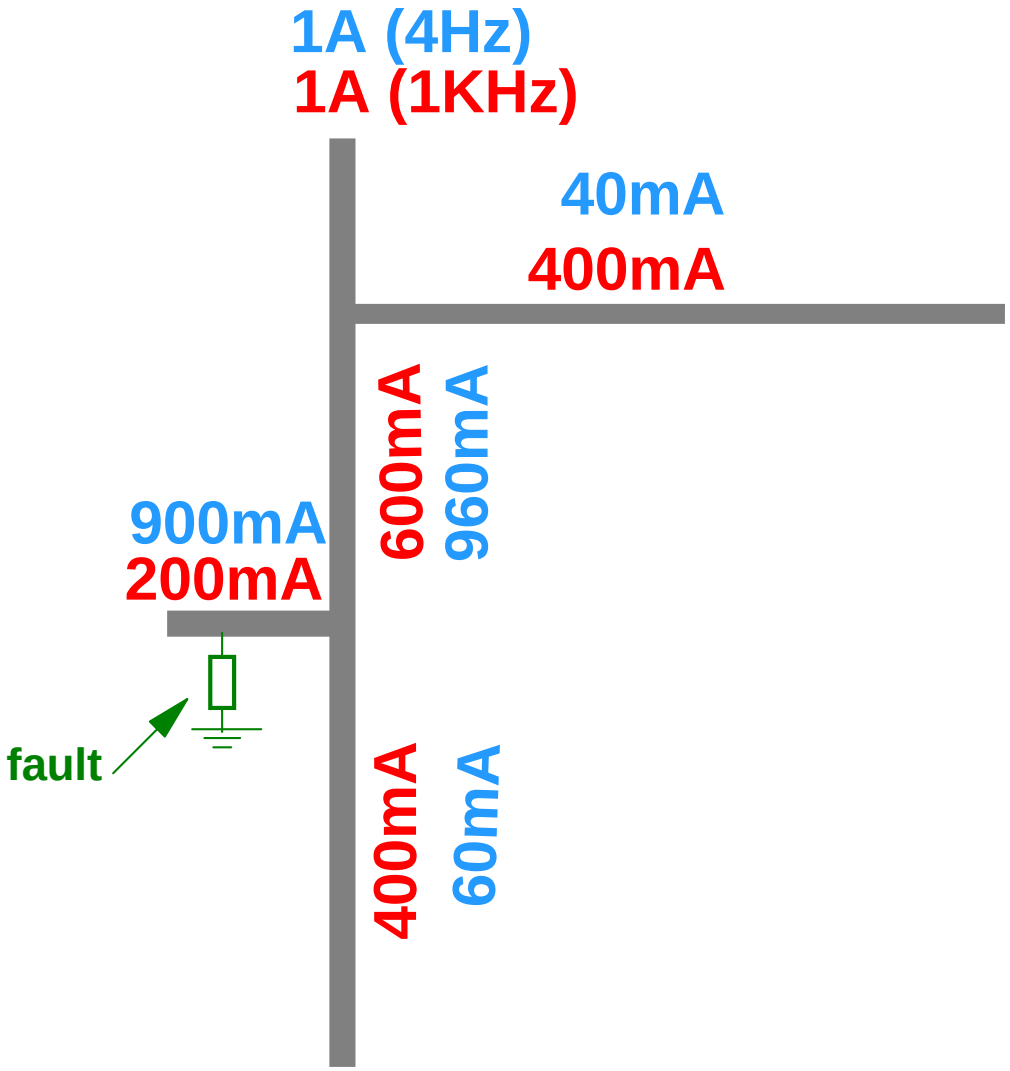
- High output power Transmitter
- Low Frequency signal
- Current Direction of applied signal
- Data logging of current measurements
- A Frame pinpointing of coating holidays

Benefits of low frequency





Benefits of low frequency



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

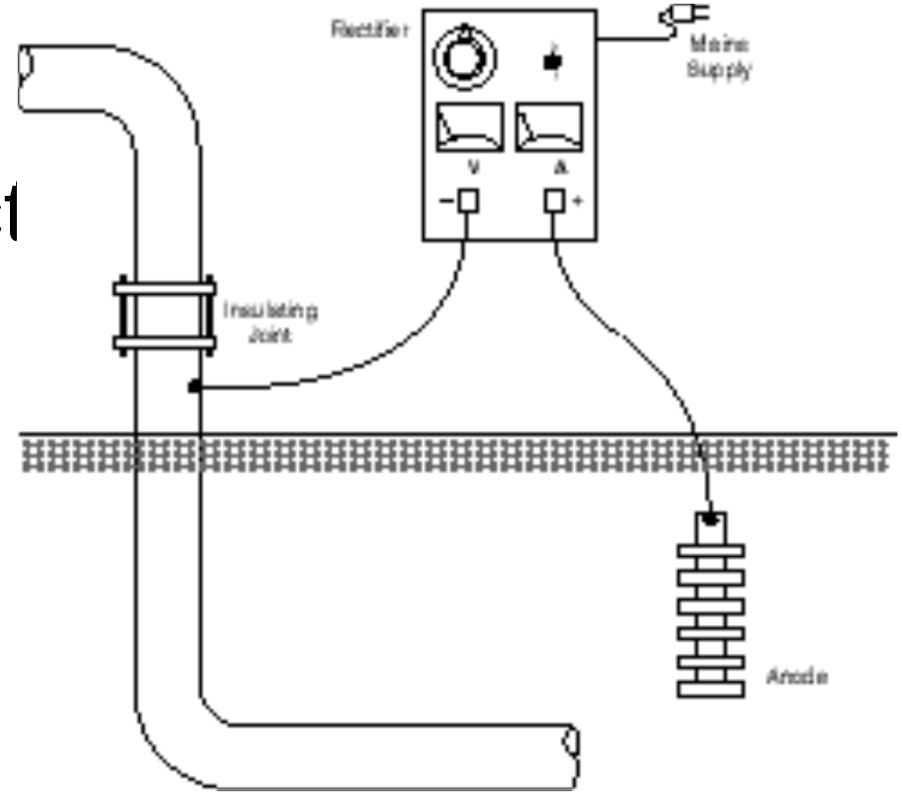
- Can be powered from…
  - 110/240Vac
  - The D.C output of a rectifier (20 to 50vD.C)
  - External Automotive batteries (24v to 48V)

PCM Receiver provides..

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

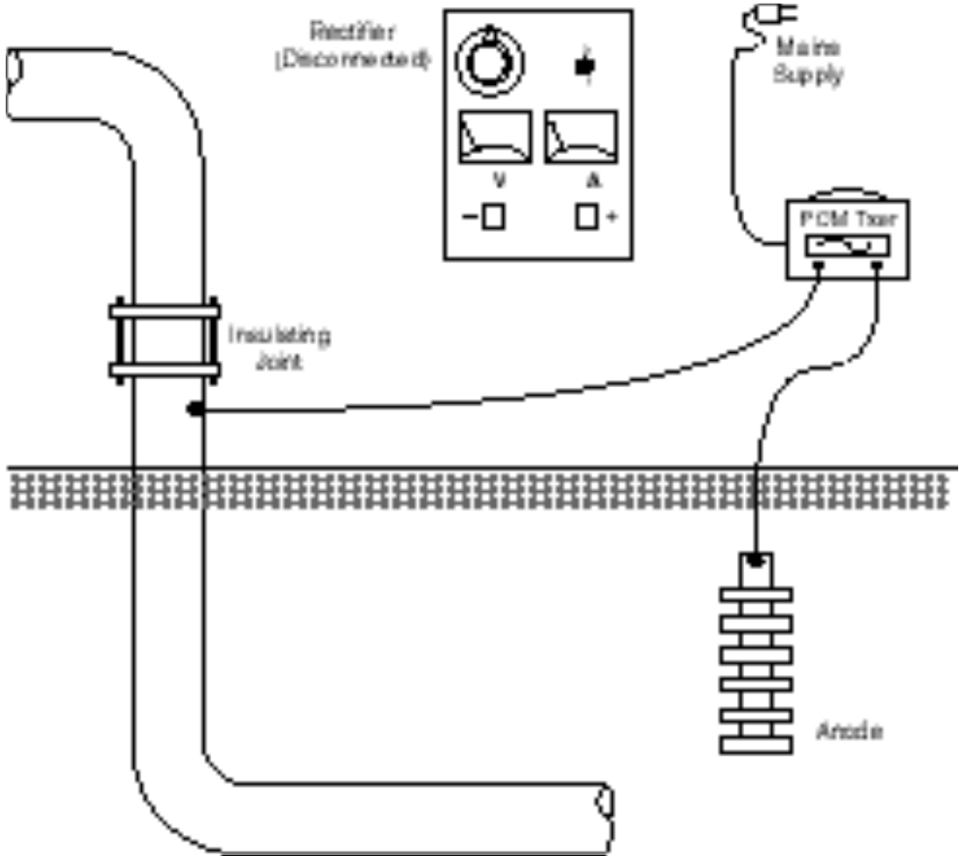
Transmitter connection

- Typical rectifier installation.
- Provides a perfect pipe connection point
- Anode provides perfect ground connection point



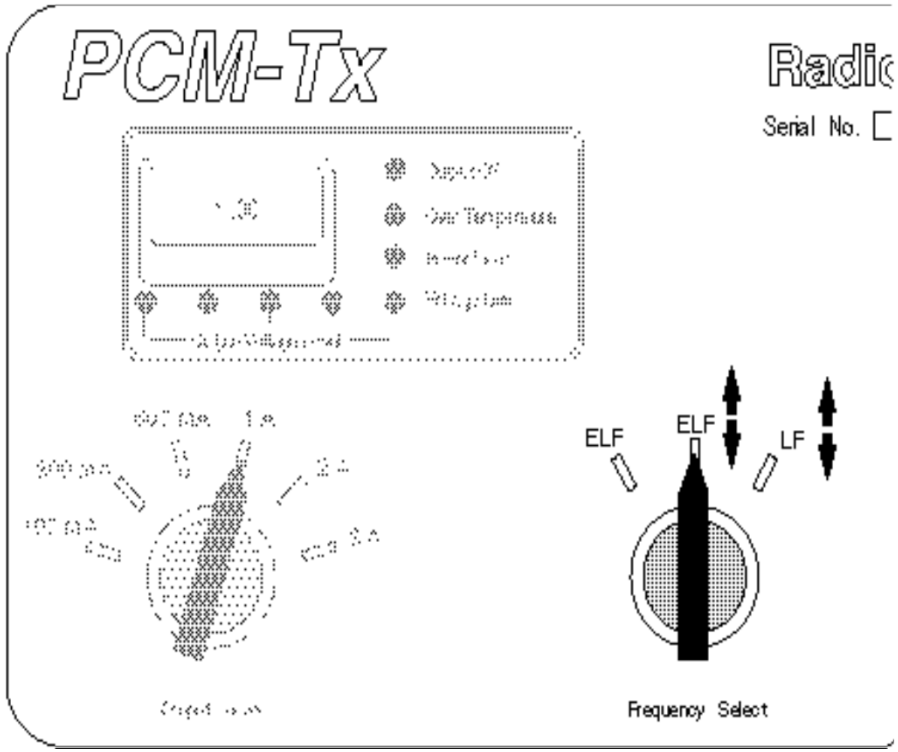
Transmitter Connection

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



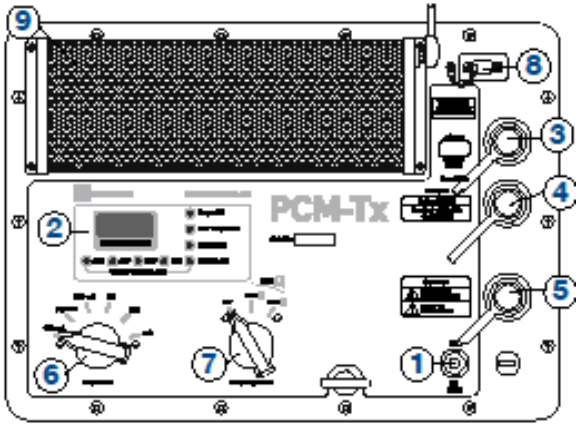
Setting the Transmitter

- Three output settings
  - ✵4Hz and 98Hz
  - ✵4Hz, 8Hz and 98Hz
  - ✵4Hz, 8Hz and 512Hz



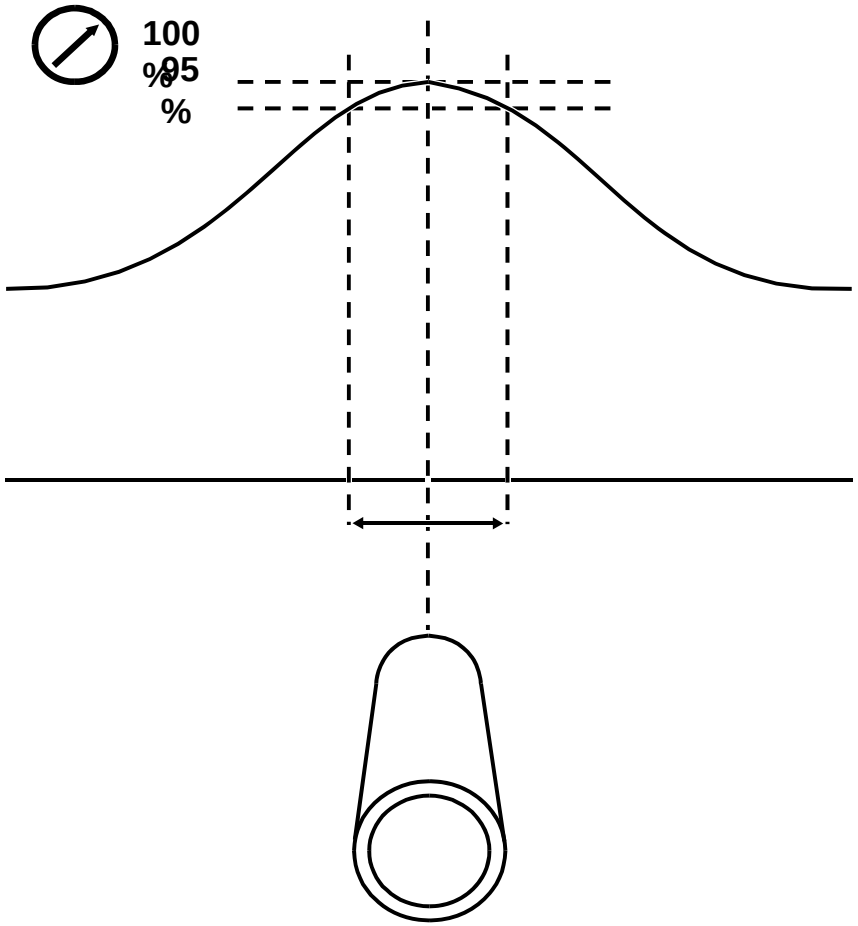
Setting the Transmitter

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



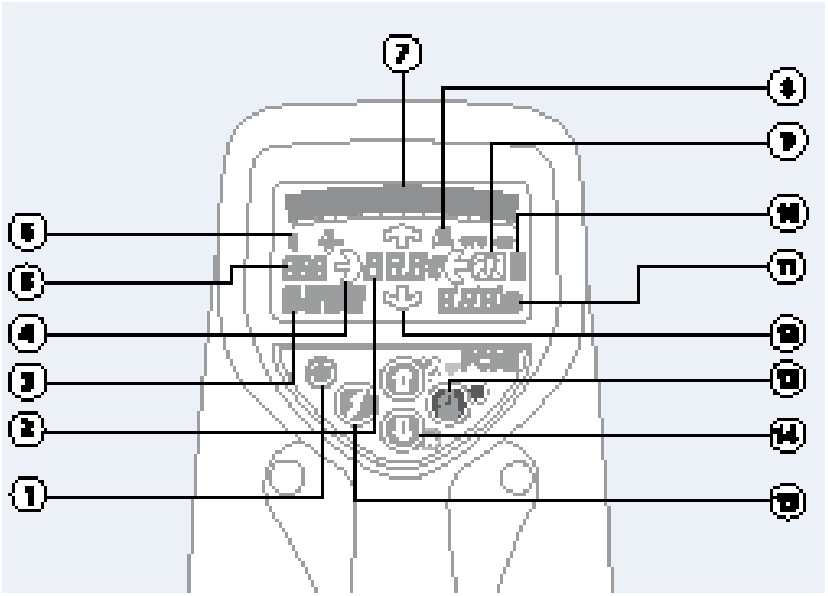
Taking current reading

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

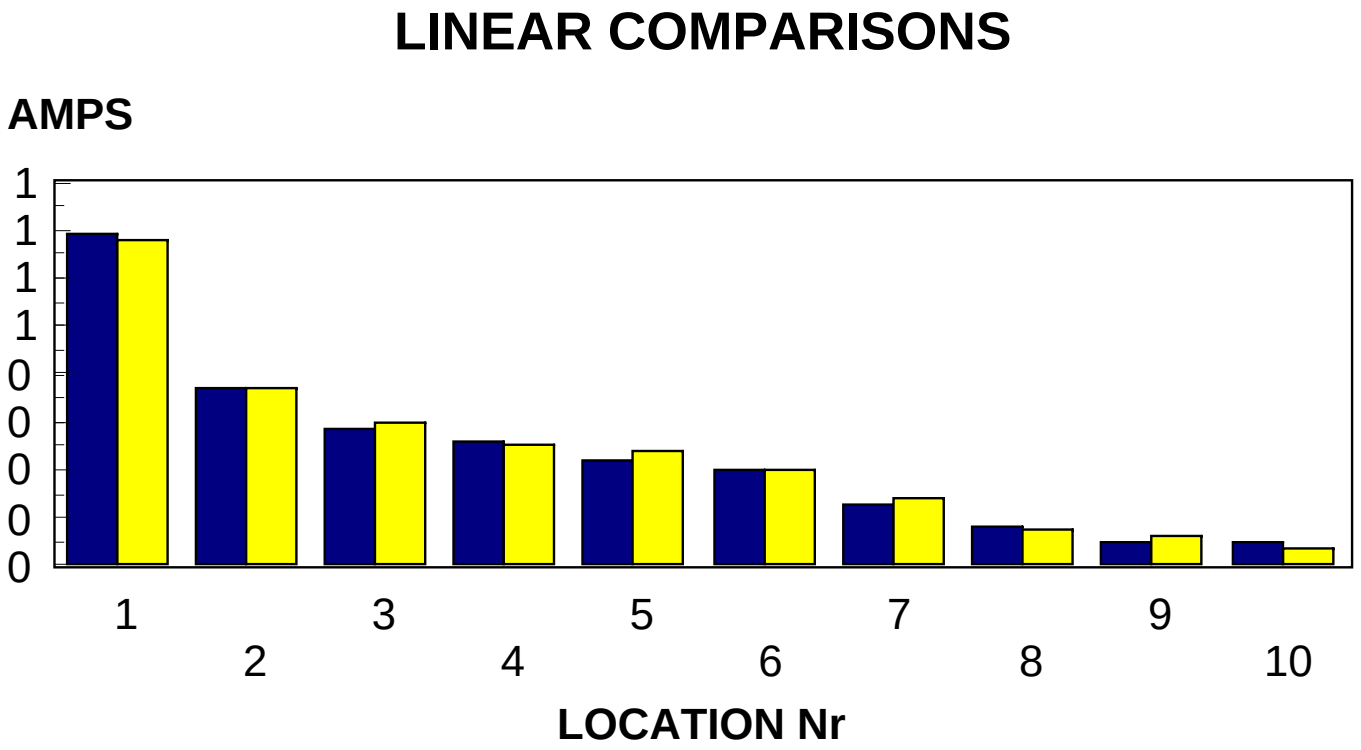


Taking Current Readings

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



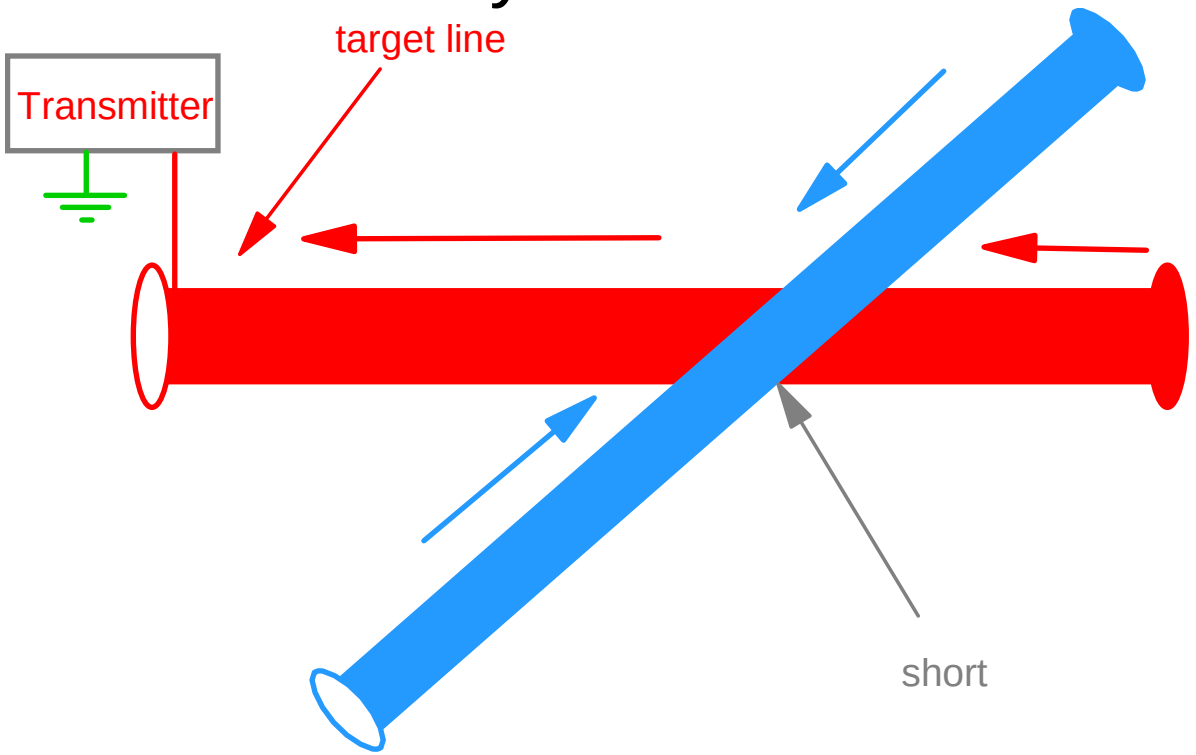
PCM current v Line Drops



Data obtained during comparative tests on site

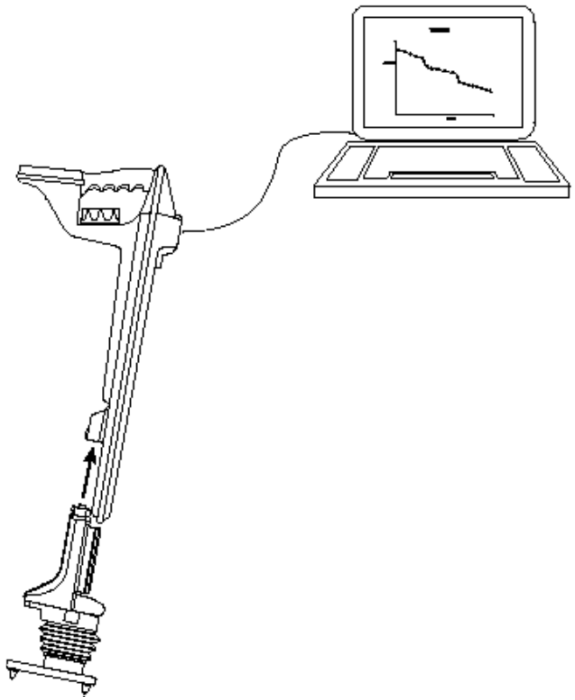
Current Direction

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



Datalogging

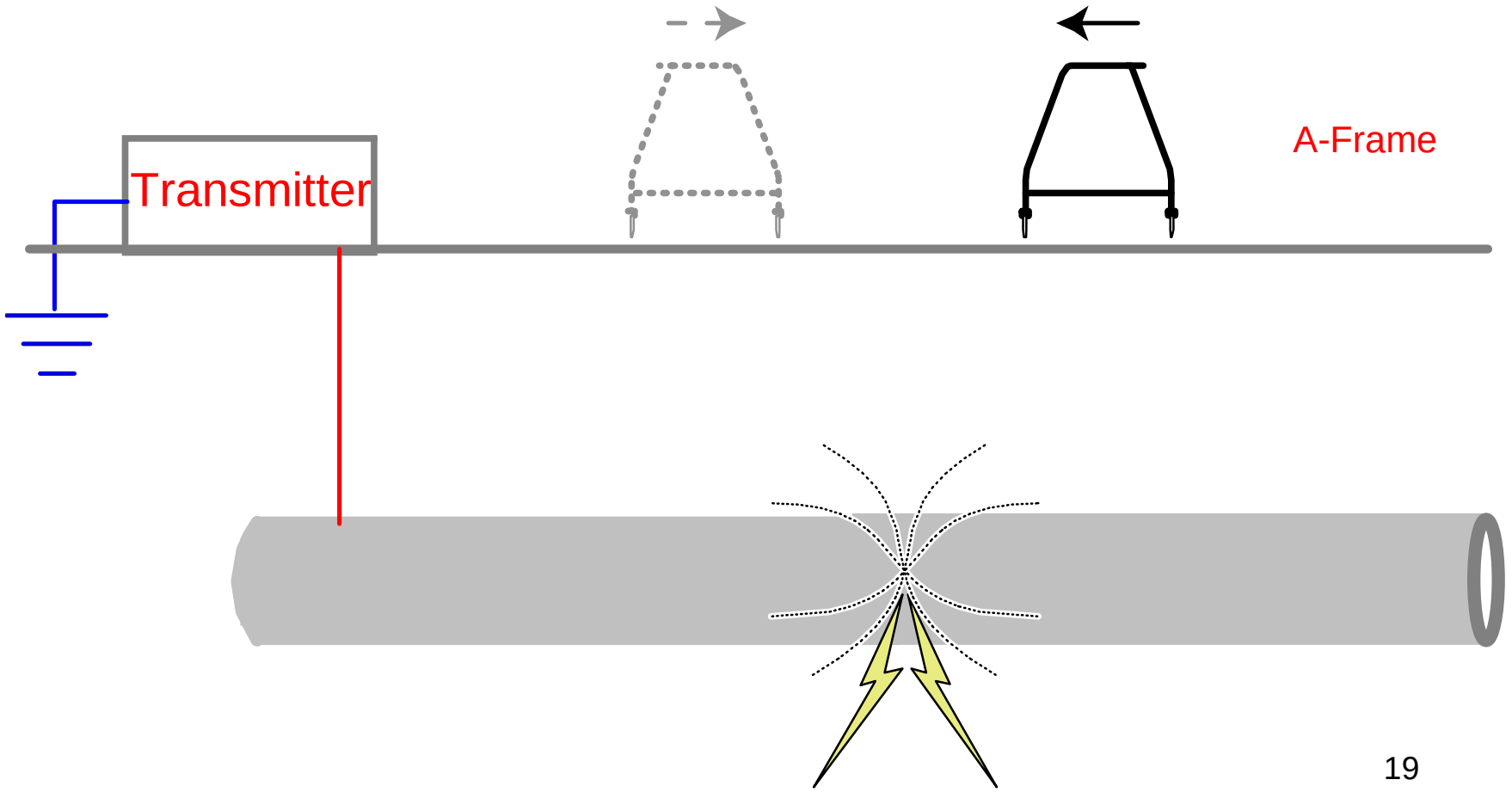
- 999 readings can be stored
- Stored readings can be reviewed on PCM+ or downloaded to PC
- Downloaded files are in text format and can be displayed using Excel or 123 speadsheets



Pinpointing Coating Defects

- For accurate coating defect location use the A Frame

Finding Coating Defects



Case Histories

Defects found by PCM

Cut away ready for repair

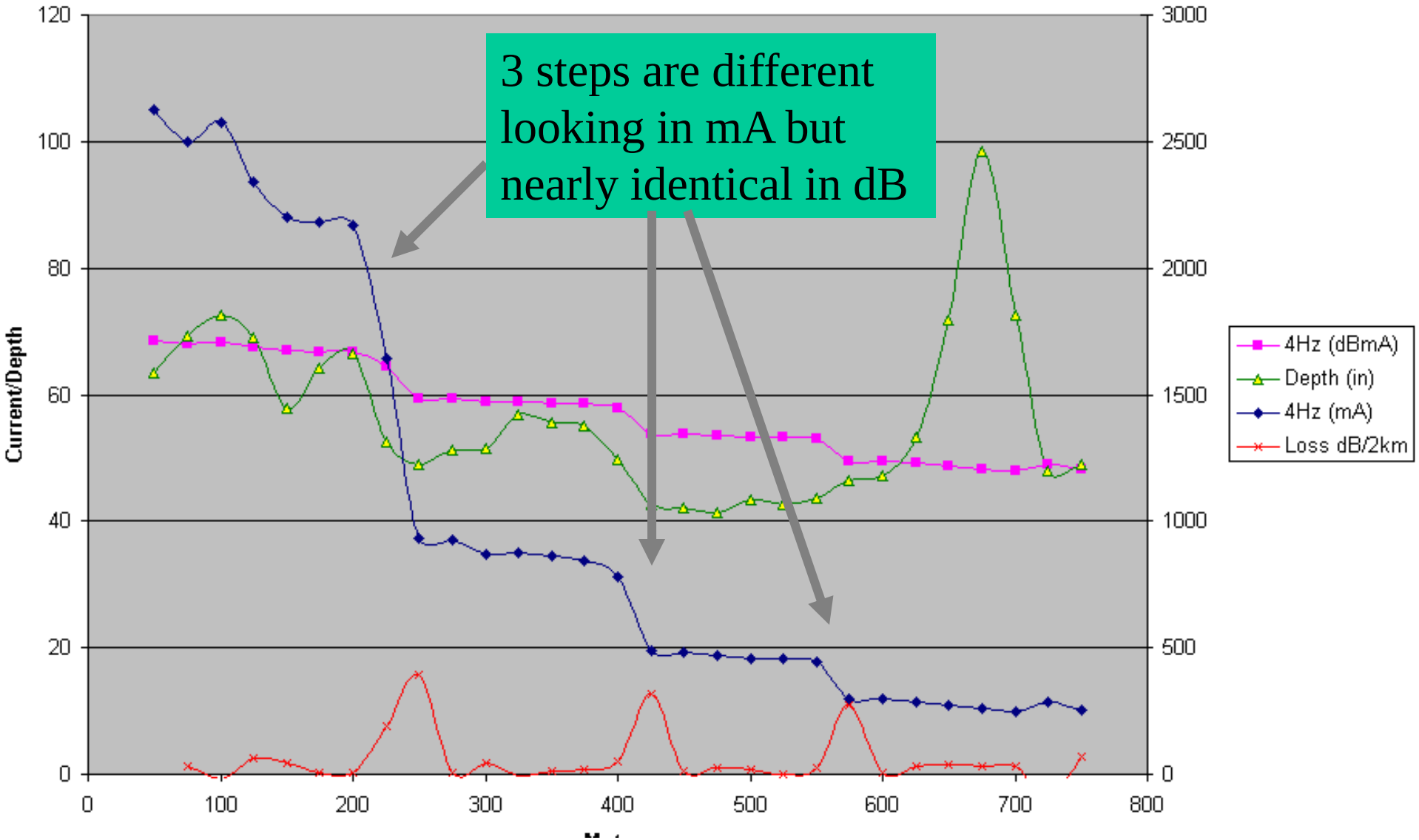
Close up view of cutaway showing area of metal loss

Cables in contact with pipe

Sheet pile in contact with pipe

Current Attenuation Graph

Actual PCM Results

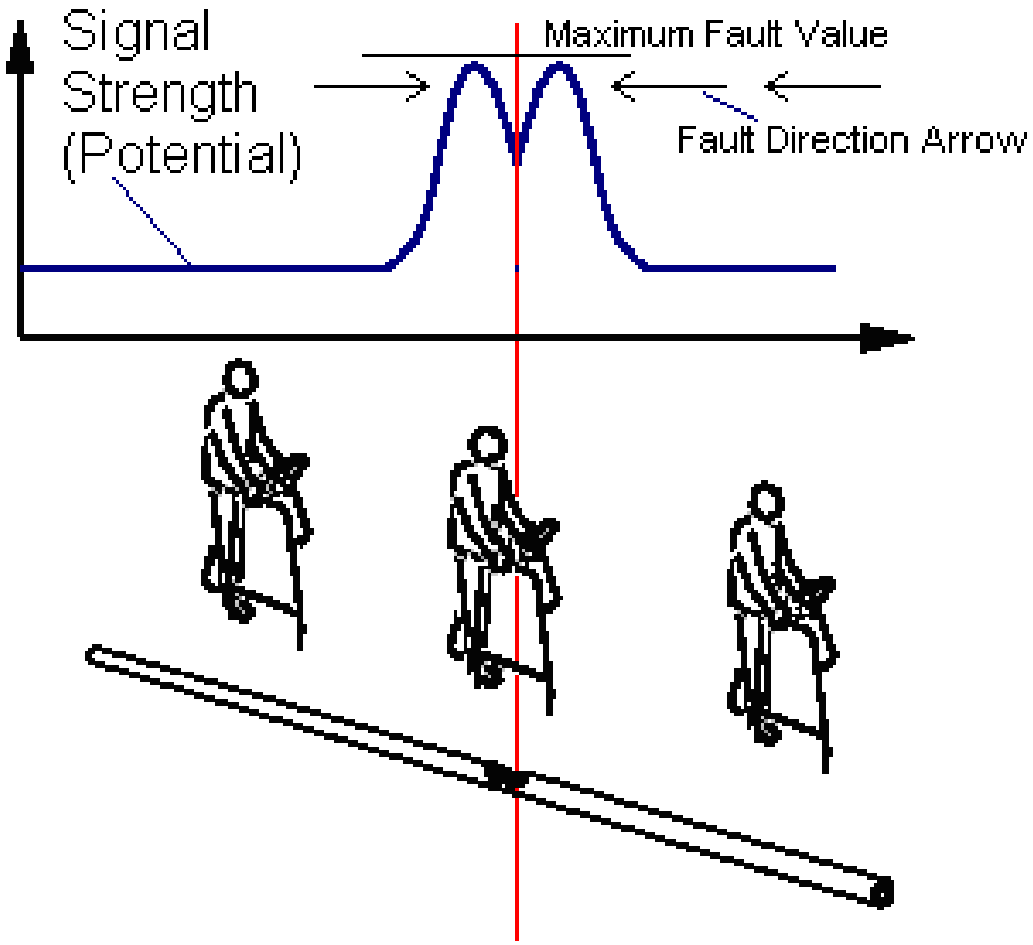


AC Voltage Gradient

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

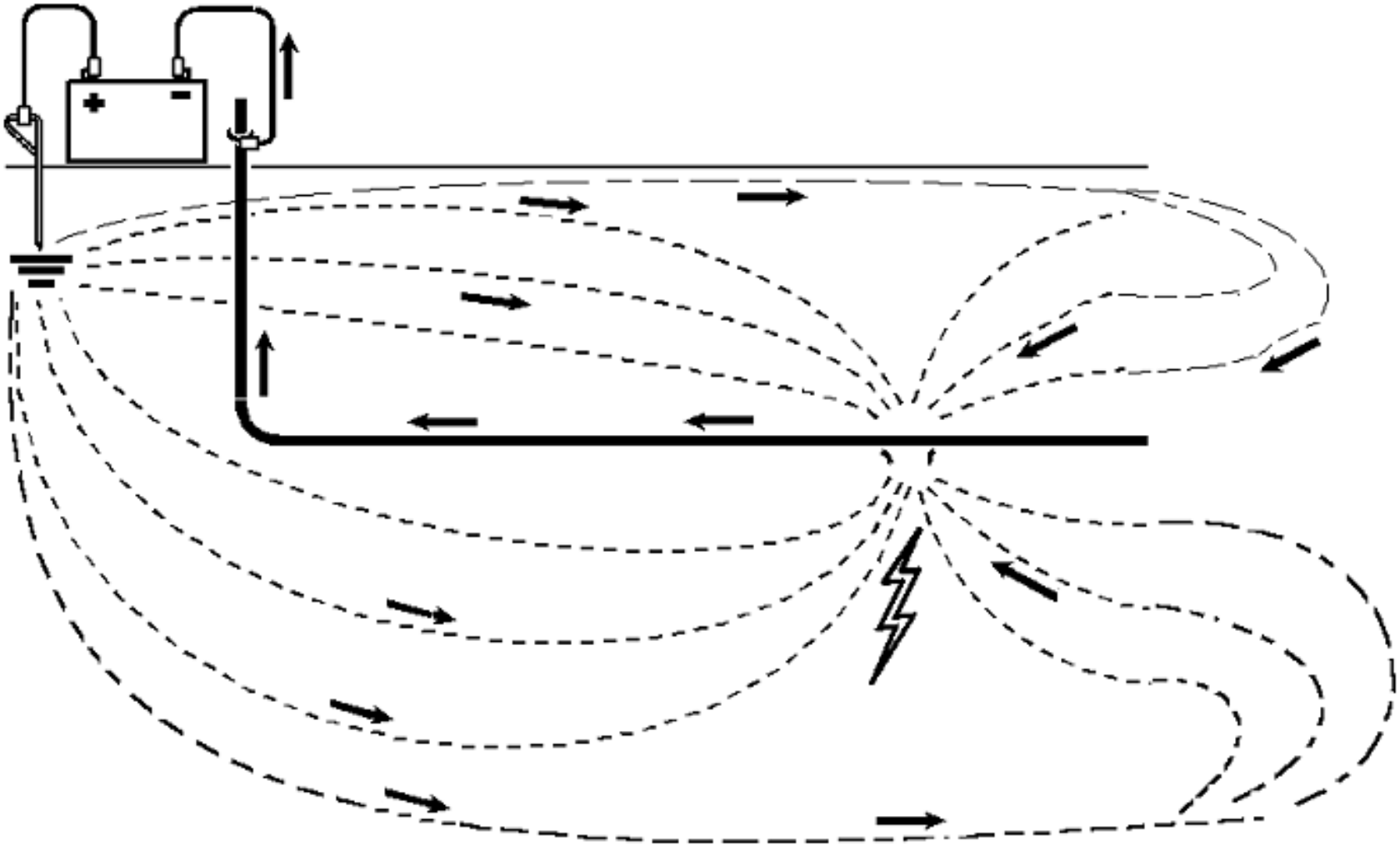
ACVG in Operation

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

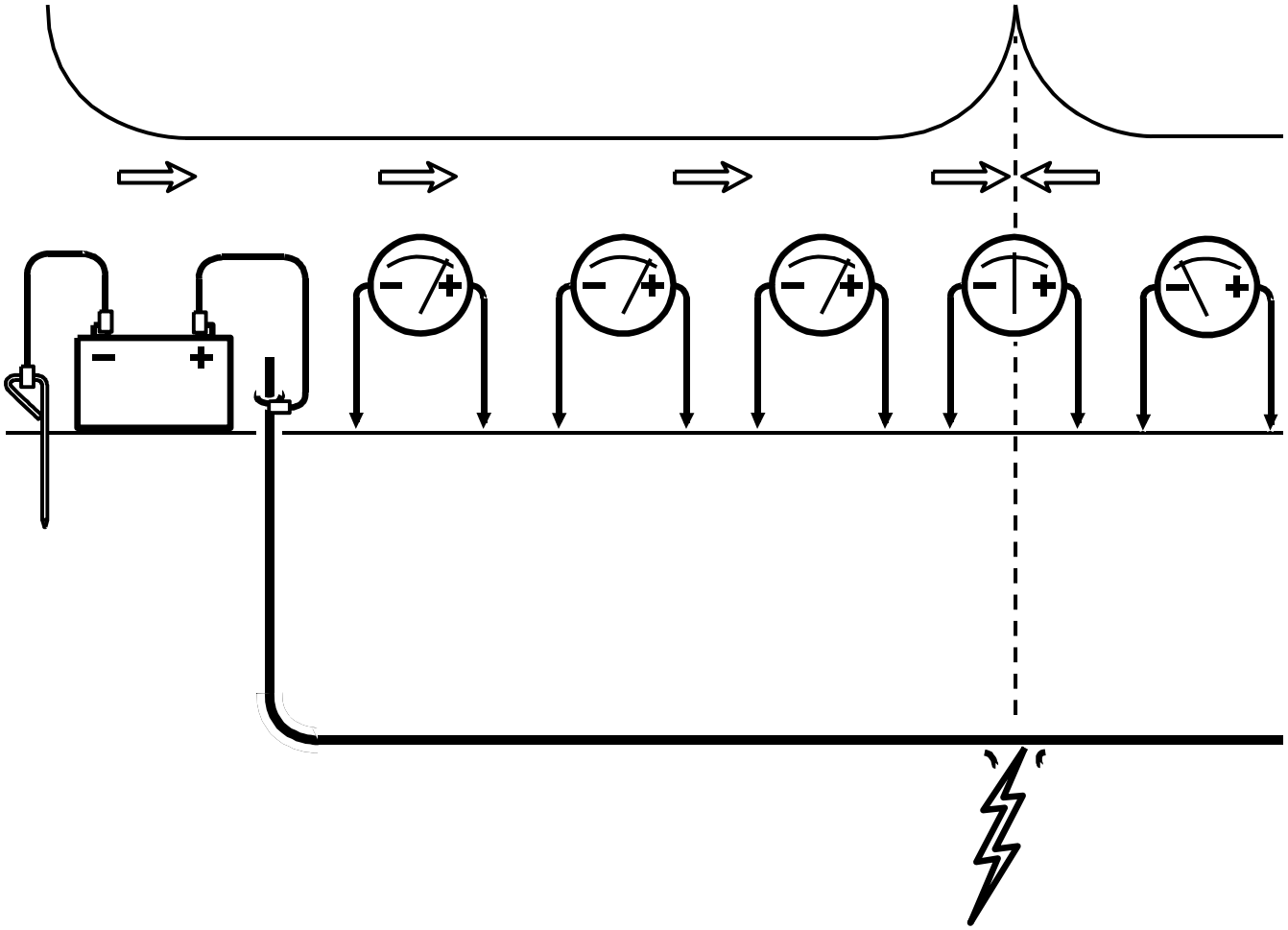


Pool of Potential

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

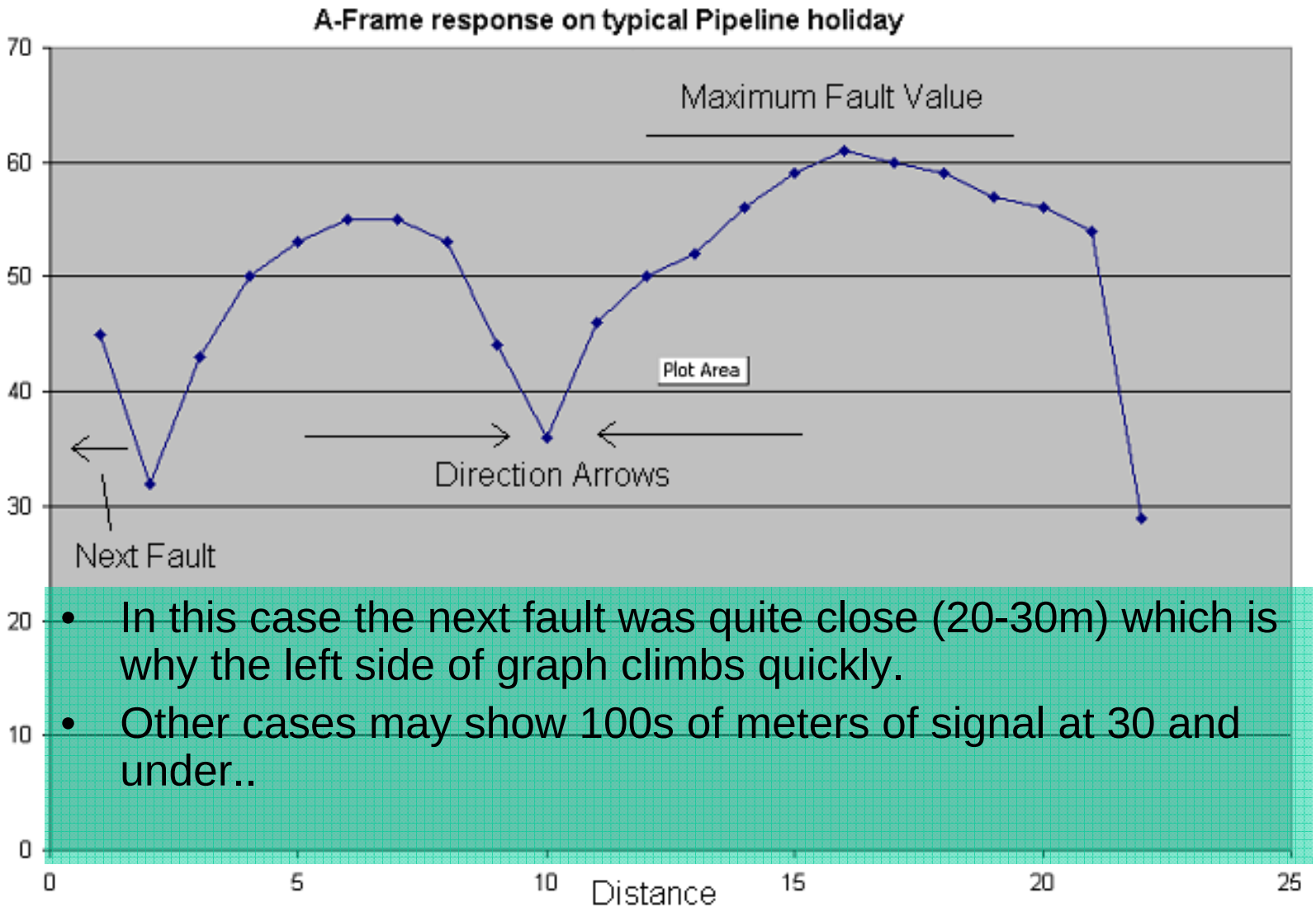


ACVG Receiver Theory



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