



"Intelligent Solutions to Complex Problems"

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High Resolution MFL
4" to 60" capabilities.

PipeWay's policy is "continuous improvement" committed to meet every pipeline challenge to fulfill our clients requirements.

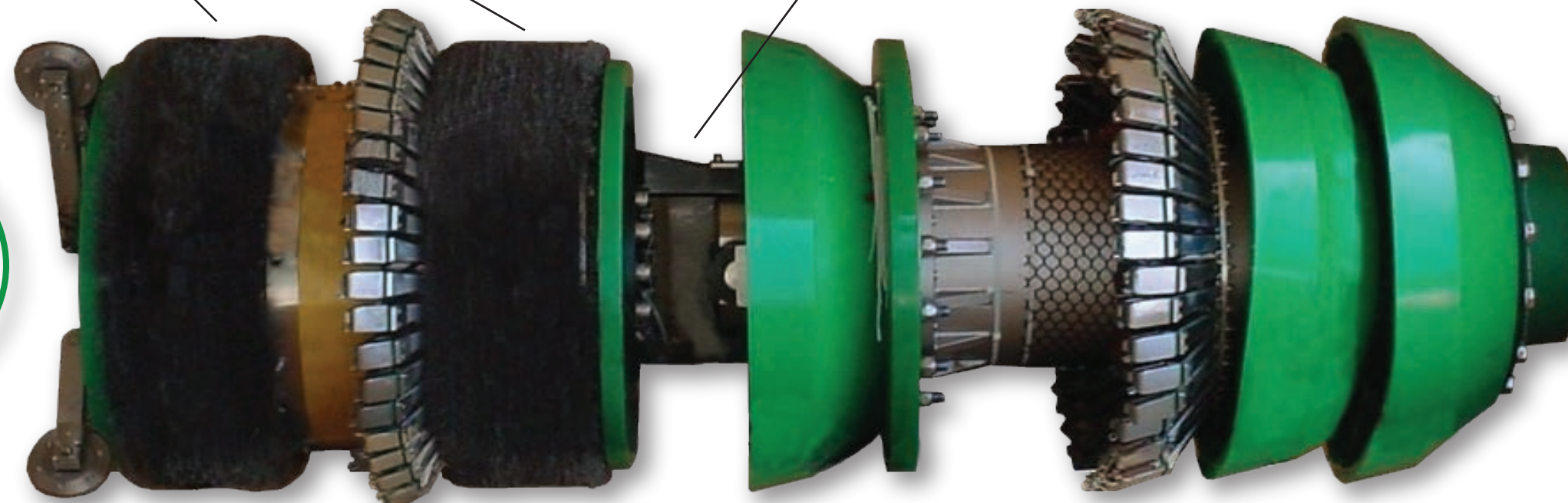
Up-to-date computer hardware and components, flash memories and signal conditioning electronics record the signals from the sensors in full, without any filtering criteria, to allow for best post-run signal analysis and comparison with future runs.

Rare earth neodymium iron boron magnets power the magnetizer of the inspection unit, providing the ultimate strength to meet most pipeline wall thicknesses for the best feature detection and sizing. Special designs can cover extra heavy wall applications.

ILI tool drive section is the sealing unit that pulls the pig through the pipeline. All sizes of the ILI tool can accommodate multiple wall thickness in the same run.

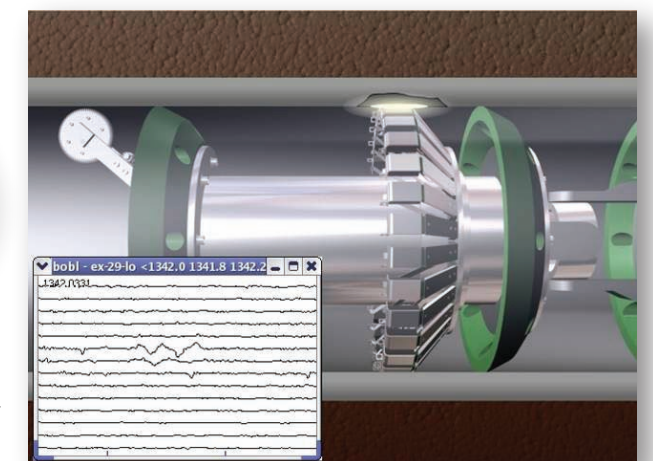
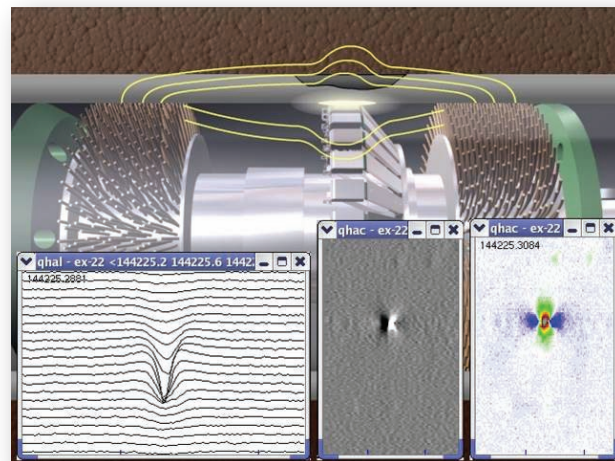
All tools are articulated for short capsule length to achieve bend radius of 1.5 D. The versatility of adding capsules or removing capsules allows the recording life of the tool to be changed with batteries to meet most pipeline lengths.

Longitudinal distance measurement to assure accurate location of anomalies. Magnetic sensors give 3 digital ticks per foot and analog sinusoid quadrature signals to allow for distance interpolation and forward/backward movement discrimination.



Closely spaced individually calibrated Hall-effect sensors measure the magnetic flux and record MFL leakage caused by anomalies in Gauss units. A typical 1/4" nominal sensor spacing provides for a true High Resolution inspection result.

ID/OD Sensors discriminate between internal and external anomalies. Each signal captured by the sensor is compared with the signals captured with the array of Hall-effect sensors monitoring the total body wall response to the magnetic field.



Porcupine

Unique Inspection for ID Defects - Patented

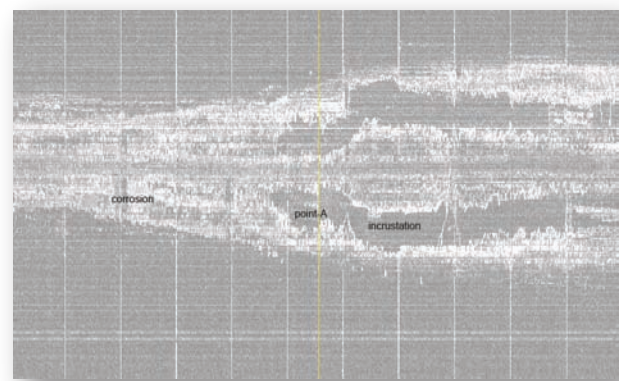
Data from the Porcupine may be compared with MFL signals from PipeWay runs or with defect tables from competitor's surveys, on a joint by joint basis. Special software tools give the ability for comparison with an integrated internal/external report when the runs are combined.

Individually calibrated sensors provide for high precision, with resolution up to 0.004" on local wall changes. Sensors are placed in offset rings to maximize pipeline coverage. The 1/4" combined typical sensor distance provides high resolution defect detection and sizing.

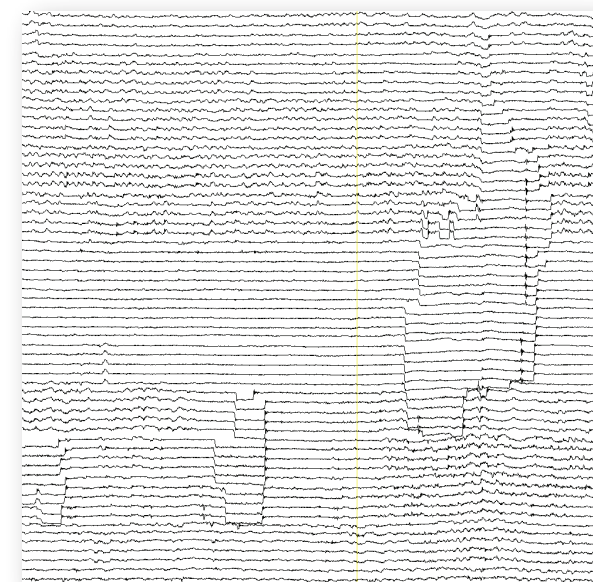
Due to the characteristics of internal general corrosion, channeling corrosion, and general wall thinning (erosion), MFL ILI tools have limitations on detection and sizing. PipeWay's Porcupine ILI solves that problem. Instead of no detection at wall or the detection of only deeper defects in an already corroded area, "true" internal wall mapping is obtained.



Unique concepts behind tool design, analysis and data management software allow the Porcupine as a "stand alone" tool or combined with MFL modules in a single ILI tool, able to do internal and external inspection in a single passage.



Detailed and precise defect mapping by Porcupine may be used by PipeWay or third party software to effectively apply Level-2 (effective area) or even Level-3 defect assessment criteria and eventually approve defects when Level-1 criteria such as ASME B31G condemns the pipeline to expensive repairs.



Magnetic based displacement sensors measure wall position with respect to tool center, indicating both metal loss and deposits such as hard wax or scale. Tools operate the same in liquid or gas pipelines.

Sophisticated mathematics embedded in the wall search technique compensate for issues such as wall thickness variations from nominal value for both minor and major changes. This technique also deals with normal pipeline ovalities, up to 1% OD. In addition, natural varying tool displacements from pipe center axis is also compensated for using the same system.

GIP

External Inspection to High Resolution MFL Standards

Caliper

Geometric Inspection

High precision odometer with accuracy in fractions of a foot, reading forward and backwards, combined with nearby pipeline features and o'clock position assures precise defect location.

GIP can be used in sub-sea applications with the same results.

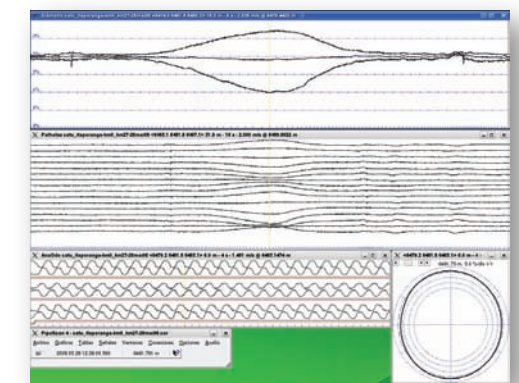
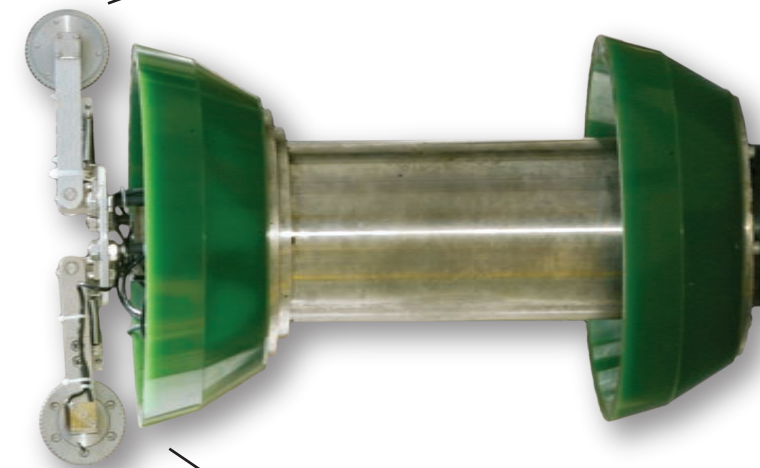
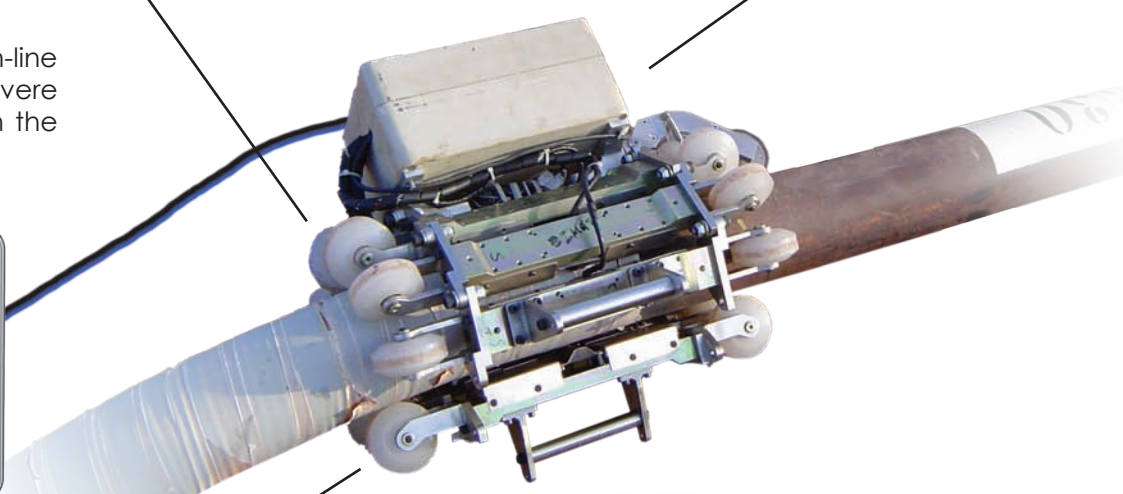
Data quality is monitored on-line real time to avoid reruns. Severe defects may be marked on the pipeline on-the-fly.

Externally mounted MFL inspection tool for non-piggable pipelines such as tank farms, piers, refineries, chemical plants, as well as very short runs where ILLI tool runs would not be cost-effective. Also an effective tool to precisely locate internal or mid-wall defects detected by ILLI tools without removing pipe coating in the process of data prove up.

Embedded data acquisition electronics and real-time data transmission to laptop PC on site.

Longitudinal distance measurement to assure accurate location of anomalies uses the same odometer system as MFL tools. Magnetic sensors give 3 digital ticks per foot and analog sinusoid quadrature signals to allow for distance interpolation and forward/backward movement discrimination.

PipeWay was the first true multi-channel standard geometry inspection tool. Embedded computer electronics and data management software advanced PipeWay's geometry tool to a high resolution level. The tool is designed to be used in the most challenging situations, to effectively detect and size deformations that can affect pipeline integrity or impede the passage of other tools. High data sampling rates and special software features allow large variation of velocity with acceptable results, a must for typical compressed air propulsion used commonly in construction jobs. Accurate data allows new pipeline commissioning based on valid data.

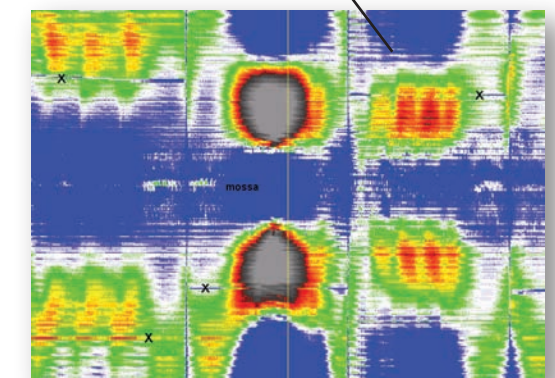
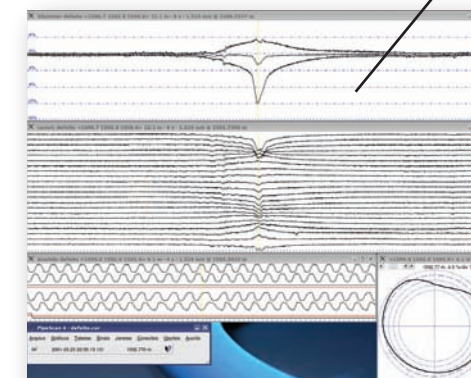
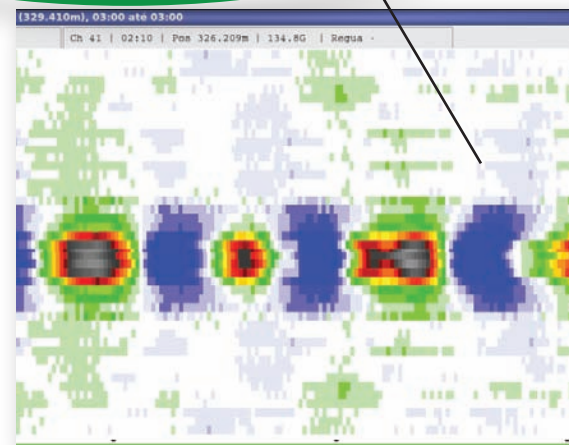
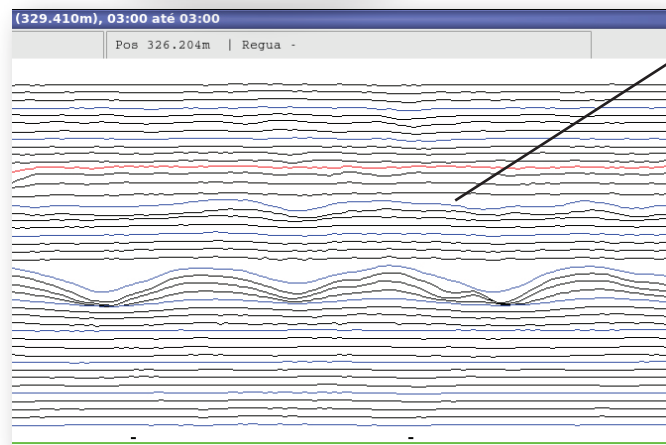


Modular magnetic and sensor assemblies supported on long life wheels allow for quick adaption to pipeline diameter and real time inspection in restricted areas of short or long sections of non-piggable systems.

A complete PipeScan software management system allows for table views of defects as well as pipeline accessories such as taps, valves and supports, assuring quick defect location. A Pipeline Coverage View is provided with zooming features to graphically navigate on the report results. MFL signal visualization is as close as a mouse click on the defect table entry. Line graph, color graph or gray scale graphing is immediately available. Software coordinates data merger to assure integrated analysis when multiple scans are required to cover the full pipe circumference.

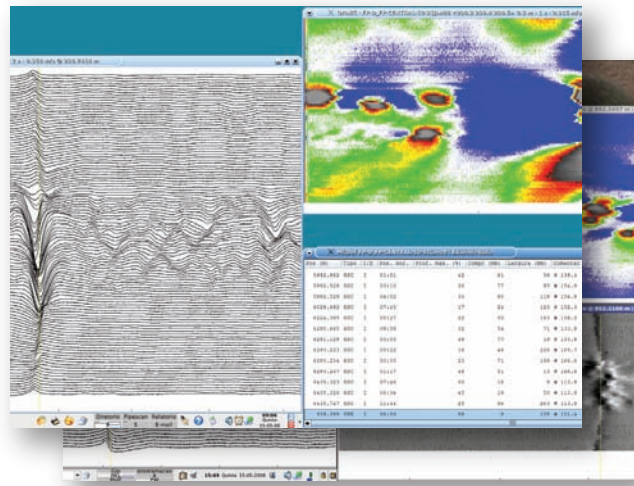
Individually calibrated magnetic based displacement sensors are strategically placed inside the cup for the ultimate in robustness.

Full data recording provides for best data analysis. Unique graphical representations for tool signal were developed by PipeWay to best characterize line features and defects. An animated section view, a min/max diameter view and a 3D view are available with the software supplied to the user. Software allows clients to manage defect, weld and pipeline features tables as well as view raw data.



Reports

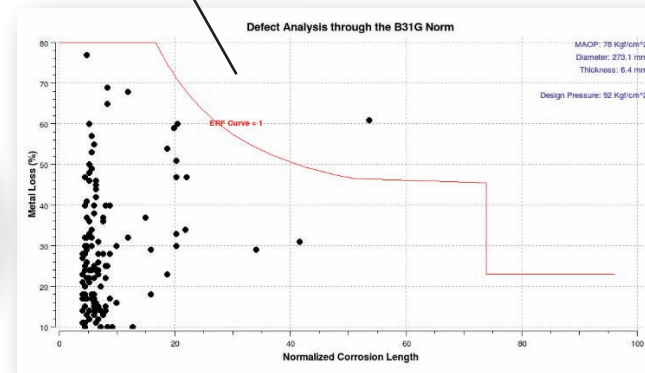
Standard and Customized



PipeWay's reports come standard to meet the general accepted norms of the industry. All reports come in a bound hard copy with DVDs or CDs that include data management software that will allow interactive client interface to run data.

Hard copy reports include pipeline defect definition data. Joint count tables in progressive format. Anomaly tables merged with joint count.

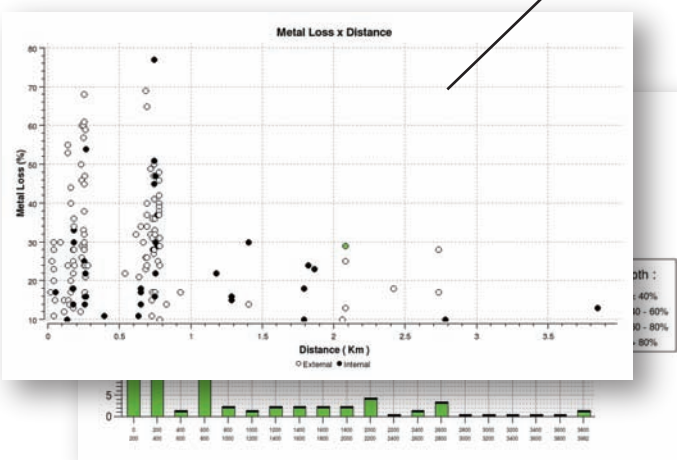
Defect data are also supplied in integrity data formats like B31G MAOP curve and safe pressure charts.



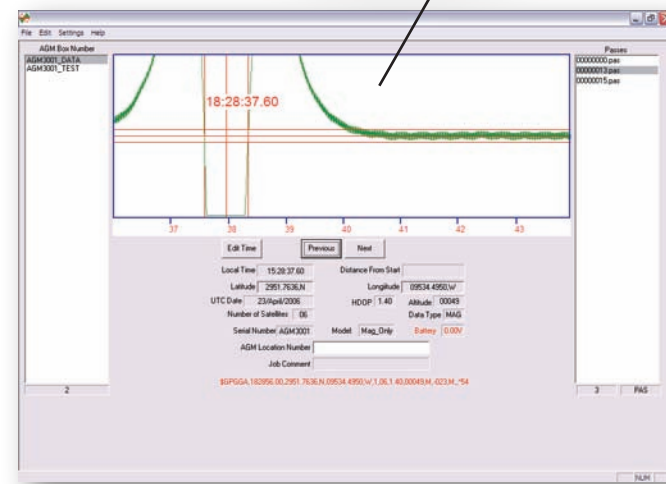
DVDs or CDs include PipeScan data management software and all raw data. Included are the table data with analytical results. Client can generate, filter and sort tables, see raw data in several graphics windows formats that are synchronized with the tables. Client analysis of statistical data with a number of interactive graphic and filtering features. In contrast to a hard copy or .pdf static report, this is a true Live Interactive Report to get the most of inspection results.

Customized reports can include extra features such as 3D anomalies representation or can be formatted to help interpretation by clients accustomed to other formats.

Statistical graphs for anomalies characteristics and density.



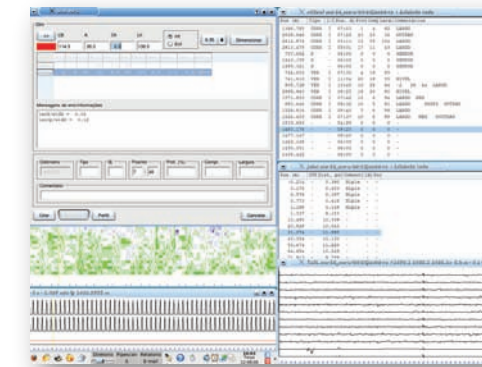
Markers listed at pipeline location and referenced to anomaly location. Significant defects are shown with color density and line graph excerpts.



Software

Power and Flexibility

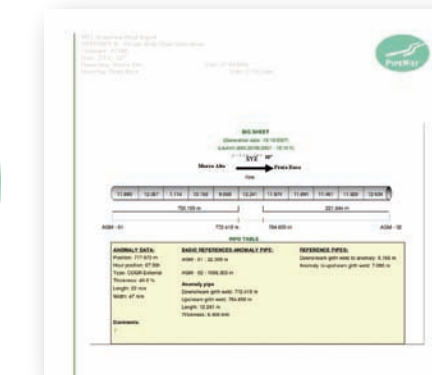
Web based MOPI software system can be used to support PipeWay's services to help clients manage run results from any inspection company with comparison of defect levels and density. Anomalies can be compared joint by joint to assure matching for comparison. Anomalies from multiple runs can be represented graphically on the same chart with different colors. Statistical analysis for corrosion growth can be performed.



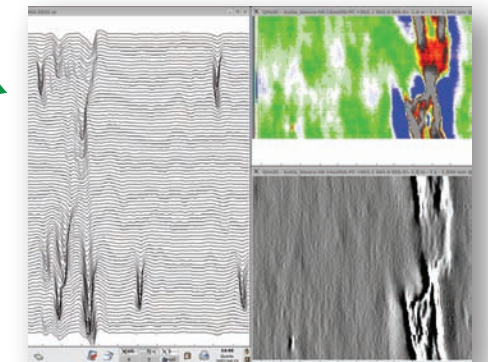
PipeScan is the data management software for MFL, Caliper and Porcupine ILLI tools. Unique table and sensor signal data windows are available for each tool, but based on common concepts and features. This simplifies client training while exploiting to the maximum tool characteristics.



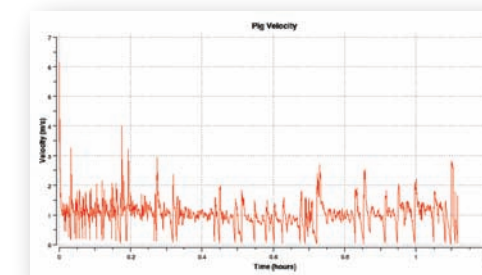
Complete Location or "Dig-sheets" can be field generated with a laptop to assist defect location and enhance field crew performance.



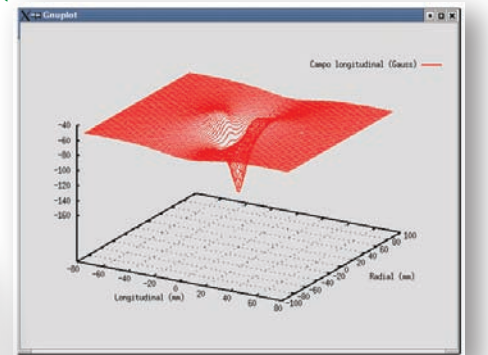
Anomaly, weld, accessory and reference marker tables can be filtered, sorted and exported to spreadsheet format. Sensor signal windows can be zoomed, panned and sensor readings and distance measurement can be accomplished on screen. Statistical and integrity charts can be filtered. Defect integrity assessment criteria can be changed and data recomputed. Magnetization level of pipeline bodywall is monitored and is available at any point.



Run velocity may be seen by time or distance and can be zoomed. PipeWay's PipeScan software can compare subsequent runs with past runs using actual recorded signals or from competitor's prior runs using table data. A click on an anomaly table entry from one run will display the equivalent sensor signals for the other run.



In addition to standard signal views for MFL, unique views were developed for Geometry and Porcupine, such as an animated section view, min/max diameter for ovalities and dents and 3D defect views.



GIPMAG is the laptop software for GIP operation and reporting. GIPMAG is a full service software package that allows all data management package that has all the features described in the MFL, Porcupine and GIP areas of this brochure. Tables and signal windows provide full access to results and raw data. A Pipeline Coverage Chart allows for graphical navigation of the anomalies and features.

Team

Purpose Driven Research and Development



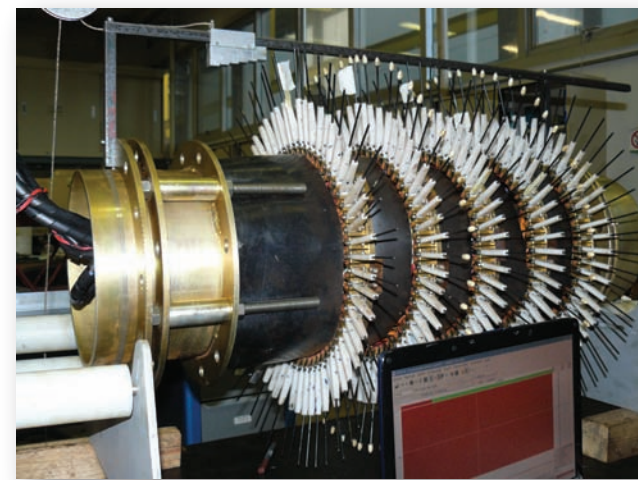
PipeWay's technology originates from PETROBRAS Research Center (CENPES) and scientific research capabilities of major universities such as Pontific Catholic University of Rio de Janeiro (PUC).

The depth of this scientific backup of PipeWay is not equaled.

The application of this support and technology to the inspection industry involves not only licensing agreements but also true cooperation with PipeWay's engineers in development projects, most of which are supported by governmental development agencies.

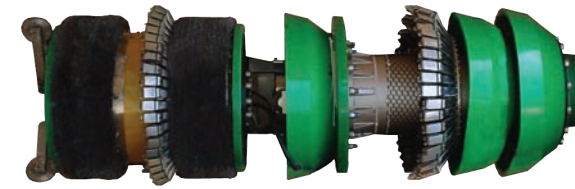
As one of the largest oil companies in the world, PETROBRAS has a broad range of inspection requirements. As one of their regular PETROBRAS contractors for ILI services, PipeWay has proved to be able to fulfill the most demanding industry requirements.

Partnership is the word to define PipeWay's attitude to address client problems. Performing difficult inspection jobs or innovative ones such as operating the GIP off-shore 120 meters underwater to inspect subsea sections of unpiggable pipelines. Partnership with industry and research to bring intelligent solutions to complex problems.

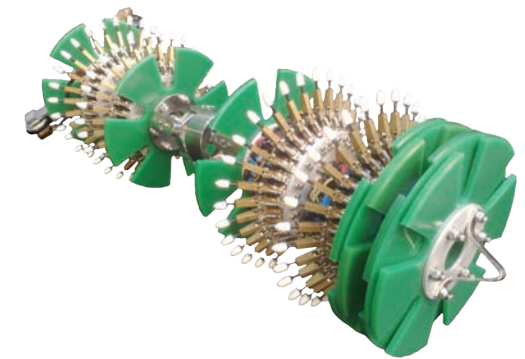


Services

MFL - High Resolution ILI



PORCUPINE - Internal Defect Mapping



GIP - External High Inspection Non-Piggable Lines (sub-sea ready)

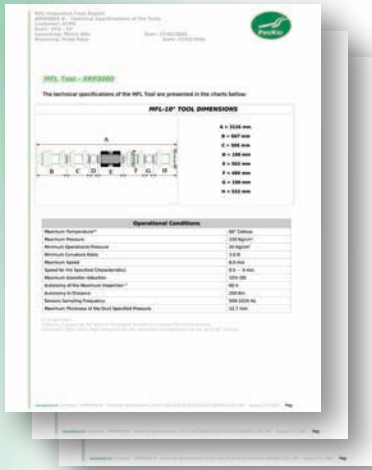


CALIPER - Geometric Inspection

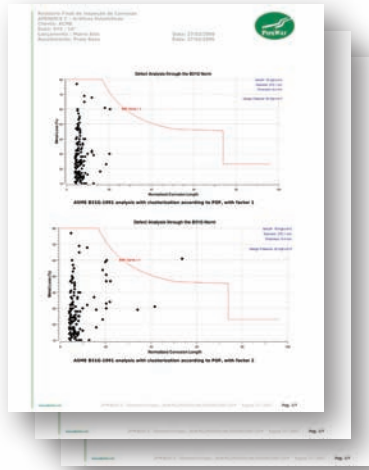


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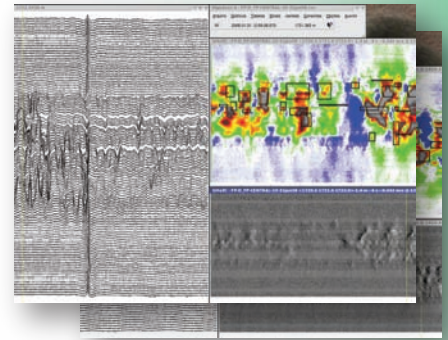
TOOL TECHNICAL SPECIFICATIONS



EXAMPLES OF REPORTS & RESULTS



INTERACTIVE SOFTWARE WITH ACTUAL RECORDED SAMPLES



VIDEOS & ANIMATED PIG RUN



QUESTIONS & PIGGING FORMULAS



PIGGING PAPERS



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