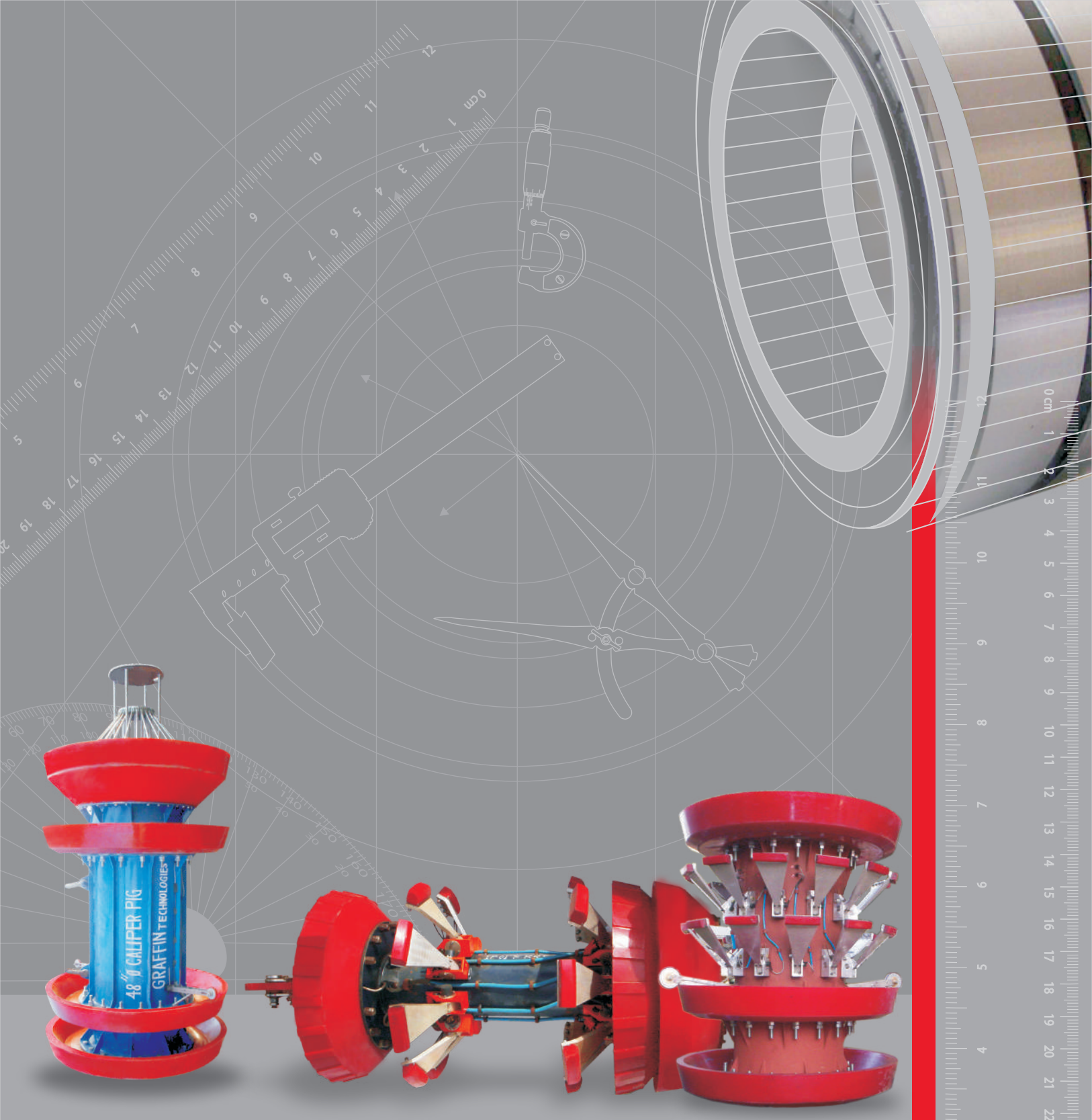


For Pipeline Electronic Geometry Inspection

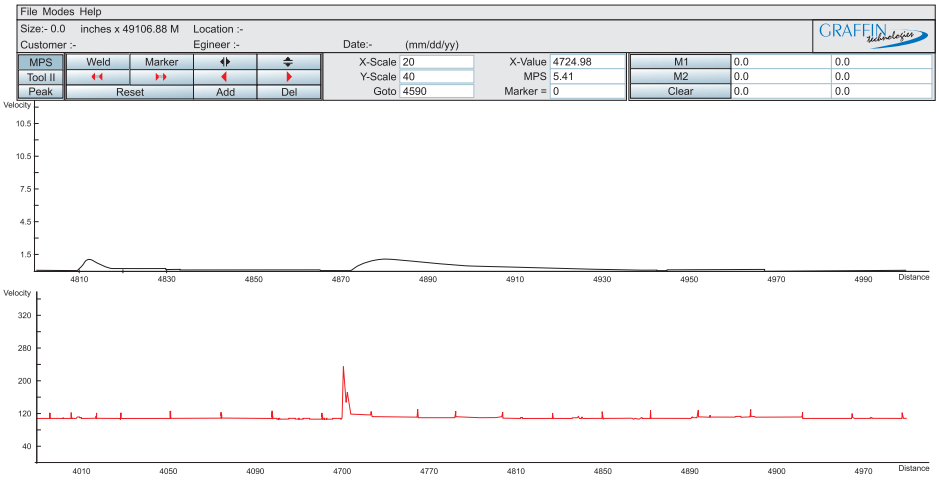
PEG / O'PEG

GRAFFIN technologies

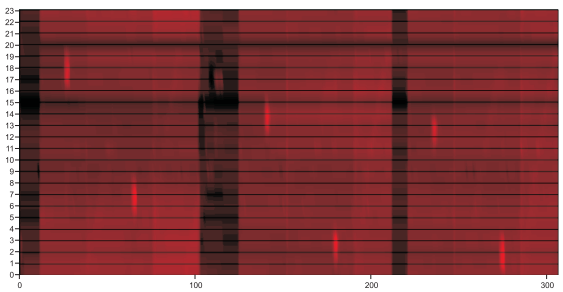
Geometry Anomalies in the pipeline like dents, twisted, buckles, ovality, wrinkles affect safe operation as they restrict the flow of transported media and tend to induce spot - like formations of sedimentation, turbulence, erosion, corrosion and hydrate. These anomalies can occur in new construction during pipeline coating, transportation, storage and laying. During operation geometry defects from the baseline are caused on the onshore line due to landslide, earth tremors and nearby construction. In the subsea lines shifting currents, floods and tides can move the pipelines from their built position.

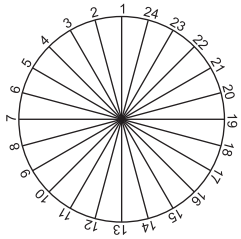
Pipelines Electronic Geometry (PEG) and O'Clock Wise Pipelines Electronic Geometry (O'PEG) developed by Graffin Technologies locates and measures the geometric deviations of the pipeline. PEG is used during the commissioning process for new construction to provide baseline data of geometry and locate and correct any anomalies present during construction. Subsequent regular runs in commissioned line check the geometric integrity of the pipeline.

Single Sensor Graph :



Multi Sensor Graph :





Mechanical fingers of the PEG/O'PEG scan the entire circumference of the pipeline. The measured data is stored on onboard solid state memory. Twin Odometer wheels with onboard distance correction for compensating for wheel slippage are provided for measuring the accurate linear distance. Industrial standard micro computer is used for continuous data acquisition.

Single Sensor PEG Tool Specifications:

Sizes available
Minimum Bend Radius
Minimum Deformation
Level Reported
Odometer Systems
Distance Accuracy
Additional Location Information
Maximum Operating Pressure
Operating Temperature Range

Multi Sensor O'PEG Tool Specifications:

Tool Sizes available
No. and type of Cups
Tool Main Body
Type of Deformation Sensors
Data Storage
No. of Odometer Wheels
Axial Accuracy
Sizing Accuracy
Radial (O'clock) Accuracy
Minimum of pipe ID the tool can pass
Minimum Deformation Level
Recorded (Depth of Dent)
Bend Radius Tool can Negotiate
Maximum speed
Maximum Operating Pressure
Operating Temperature Range

The data after the run is downloaded and is available for immediate analysis. Basic data delivered by PEG/O'PEG includes charges in internal pipe diameter, odometer information, marker information (if used) and velocity.

Final reports are provided as a hardcopy or a CD.

: 8 to 48 inches
: 3D (1.5 D on request)
: 2% pf pipe ID
: Two odometer wheels
: +/-1 m from nearest Girth weld
: above ground makers
: 100 bar
: 0 - 70 degree

: 8 to 48 inches
: 2/3 Polyurethane cups
: Carbon Steel
: Low mass, behind the cup Sensor arms
: Solid state flash memory
: 2 Nos.
: +/- 1 mtr from the nearest pipeline feature i.e. girth weld, change in wall thickness etc.
: +/- 1% of ID.
: +/- 10 degree
: 15% Reduction in Pipe ID
: 2% of Pipe ID
: 3D (1.5 D on request)
: 4.8 mtrs / sec
: 100 Bar
: 0 – 70 degree

ADVANTAGES OF ELECTRONIC GEOMETRY SURVEY/ CALIPER SURVEY.

- Provides base line data regarding pipelines internal geometry.
- All anomalies & defects above 2% of diameter are registered irrespective of the wall thickness with location.
- Partially Closed valves, buckles, tap coupons are detected with location.
- Excess penetration & mitre joints are detected, with location.
- Ensures compliance to ASME sec B 31.8 regarding detection of dents, gauges and other anomalies.
- Provides geometrical data for use of pigs which are extremely limited in the amount of line reduction or bend radius they can pass without damage to the took or the pipeline.
- Provide cross reference data for future corrosion loss pigging data.
- Cost effective as compared to manual inspection detection of anomalies using gauge pigs.
- O'PEG provides radial (O'Clock) position.

DISADVANTAGES OF ELECTRONIC GEOMETRY SURVEY/ CALIPER SURVEY.

- Metal loss is not detected.
- Internal Debris such as welding rods, gravel etc. can be interpreted as dents / defects if not cleaned prior to caliper survey.

GRAFFIN technologies

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