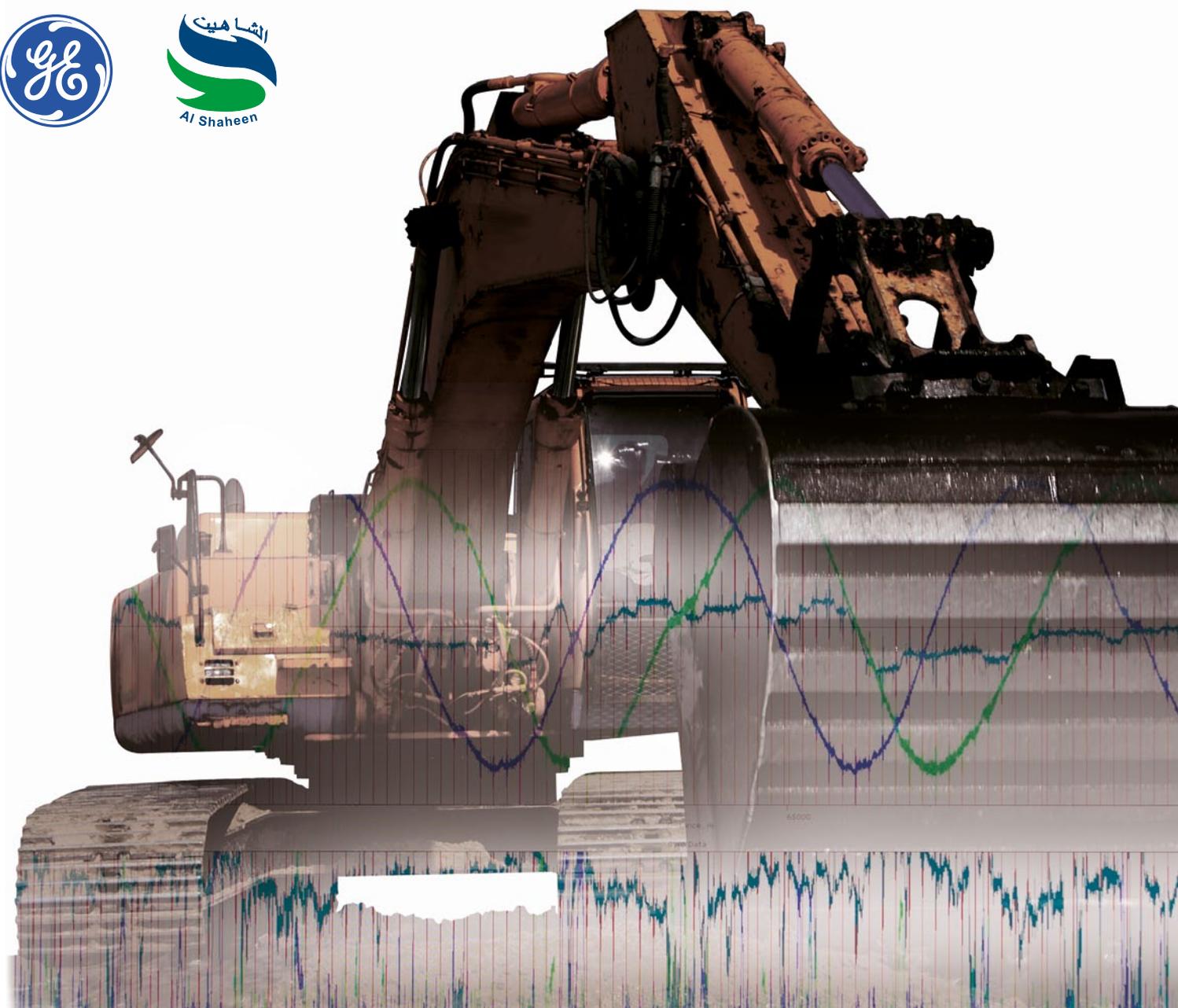


Using accurate and reliable in-line inspection data to reduce repair costs



In these times of challenging market conditions, it is even more critical than ever for pipeline operators to be as efficient as possible, without compromising on safety. PII Pipeline Solutions can help you achieve this goal by providing more accurate and reliable inspection data — which minimizes the number of digs and repairs needed, without missing any features that could potentially fail a hydrostatic test.

Safer operation + longer asset life + lower total costs

When operators dig based on standard resolution ILI data, it's common to find that around 20% of defects (see examples on facing page) are actually below the criteria for immediate repair. This is an extremely expensive discovery to make in the ditch.

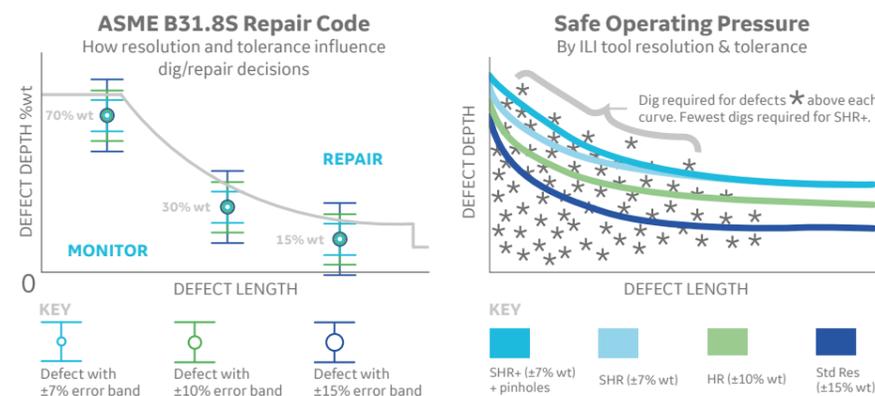
The Super High Resolution (SHR) and “+” data from PII's next generation ILI technologies can avoid many unnecessary digs and repairs. Accuracy is about a lot more than just sizing tolerance. Effective assessments require characterization of the feature type and surrounding influences (e.g. location, weld types and feature topography). These additional details are needed to move beyond a “pig and dig” approach, to deliver an efficient and effective, targeted repair campaign.

Our latest MagneScan and UltraScan tools are designed with faster and smaller electronics that enable more frequent axial scans and greater circumferential sensor coverage, resulting in significantly tighter inspection grids. This improves the probability of identification (POI) and sizing accuracy, and enables higher inspection speeds. Their higher accuracy and reliability provide the confidence needed to prioritize remediation of critical defects that could lead to loss of containment — and only dig where immediate attention is needed — while non-critical defects can be safely monitored for extended periods before any intervention is required.

Higher data resolution improves corrosion management

As ILI resolution and accuracy increases, the cost of effective dig programs goes down, because when you add the tolerance bands of the respective ILI tool used to reported sizes, fewer defects are close to or on the mitigation curve (B31.8 or the predicted burst pressures using RSTRENG). In the graph below, the three metal-loss features would be selected for repair unless the accuracy of the ILI gives confidence that the actual depths are below the selection criteria.

These new higher resolution ILI tools can detect metal loss as small as 5 mm in diameter and, when greater than 8 mm in diameter, can size to ± 0.2 mm at 80% certainty. While those are the published specifications, a North American customer recently validated our UltraScan WM+ tool to higher certainty levels for general corrosion as well as pitting and pinholes.



New specifications also improve crack management

Our UltraScan CD+ and UltraScan Duo tools also provide the better resolution and sizing needed to deliver large savings through targeted digs for only critical cracks. These tools can report defects as small as 15 mm long and 1 mm deep, and when 25 mm long and 1 mm deep, can size with an accuracy of ± 0.7 mm in the body of the pipe or ± 0.9 mm in the long seam weld area, with 80% certainty.

Our latest high-resolution tools and specs include:

MagneScan SHR

5 mm diameter, 15% wt
 $\pm 7\%$ @ 80% certainty
 $\pm 10\%$ @ 90% certainty

UltraScan WM+

Minimum detection: 5 mm diameter x 1 mm
Sizing @ 8 mm x 1 mm
 ± 0.2 mm @ 80% certainty
 ± 0.4 mm @ 90% certainty

UltraScan CD+

Minimum crack detection: 15 mm x 1 mm
Absolute depth sizing @ 25 mm x 1 mm
 ± 0.7 mm in pipe body @ 80% certainty
 ± 0.9 mm in long seam weld @ 80% certainty

Lets you work towards ZERO pipeline failures

More trustworthy data enables smarter decisions

Provides more accurate and reliable engineering assessments

Describes what is really happening in your pipeline

Eliminates unnecessary excavations and repairs

Delivers significant cost savings

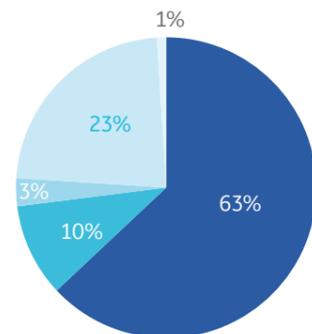
Higher res = higher value

Sample calculations (US dollars) for a 160 km, 24" pipeline with typical defect population derived from our extensive historical records of ILI projects worldwide.

Cracking

USCD Standard Resolution

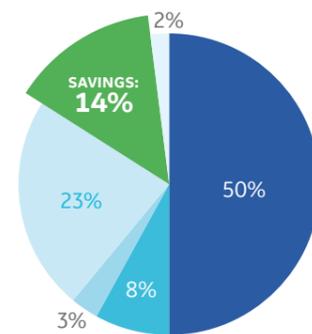
Dig and repair program with 50 dig sites



\$10,288,500
TOTAL PROGRAM COST

UltraScan CD+ or UltraScan Duo

Absolute sizing specifications required only 40 repair digs



\$8,887,000
TOTAL PROGRAM COST

Benefits of absolute depth sizing

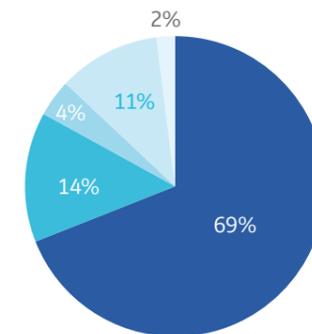
- 20% fewer outliers
- Avoided 10 unnecessary digs and associated costs (NDE, HSE)

SAVINGS
\$1,401,500

Corrosion

MFL Standard Resolution

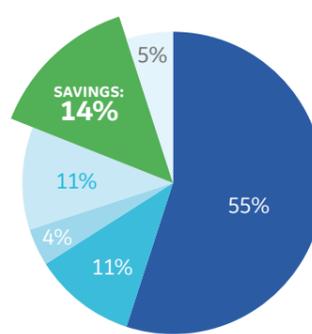
Dig and repair program with 50 dig sites



\$3,700,000
TOTAL PROGRAM COST

MFL New MagneScan SHR

Specification required only 40 repair digs



\$3,210,000
TOTAL PROGRAM COST

Benefits of SHR

- No outliers
- Avoided 10 unnecessary digs and associated costs (NDE, HSE)

SAVINGS
\$483,000

ILI Total Program Cost

We encourage you to make your own evaluation based on your particular pipeline system and ILI programs, using the formula below. Substituting different ILI technologies will have an effect on other costs, as well as the overall certainty and confidence you have in the resulting dig prioritization and repair plan.

$$TPC = I + E + N + R + V$$

DEFINITIONS

- I** ILI costs including selection of pipeline sections, preparation (proving and cleaning) and inspection
- E** Excavation costs including permitting, HSSE, back filling
- N** In-ditch NDE costs including wrap removal, pipe preparation and inspection
- R** Cost of repair installation and recoating
- V** Cost of dig verification and feedback to ILI vendor on the accuracy of the ILI program, including any costs related to re-analysis, report re-issue, and any consequential works.



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