24th World Gas Conference
ARGENTINA | 2009
5-9 October

The Global Energy Challenge:
Reviewing the Strategies
for Natural Gas

WOC3

Study Group 3.2

WGC 2009

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The objective of the SG3.2 is to develop a consensus on the technical needs and challenge for future R&D and to support the exchange of information among the experts of the gas industry.

a) Identification of the general problems affecting the gas transmission industry in the different geographical areas

b) Evaluation of new tools and methodologies available in the Gas Transmission industry to manage existing problems related with a).

c) Developing contributions by the SG 3.2 on specific issues, through the support of the Members of the SG related with a)

a) Identification of the general problems affecting the gas transmission industry in the different geographical areas

- The information was submitted by the members of the Study group, trying to cover the different geographical areas in accordance with their respective countries.
- The main common threats of the Gas Industry have been identified and listed for its evaluation
- Europe – USA – Canada – Japan- South America (Argentina)

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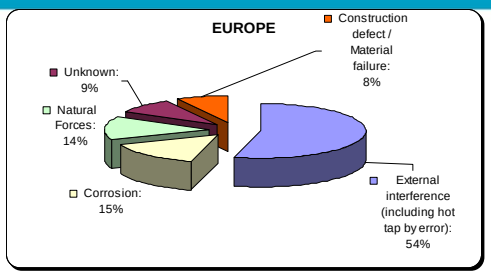

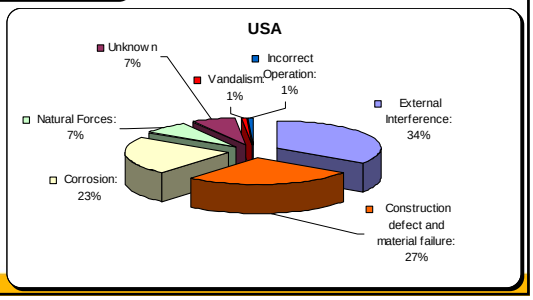

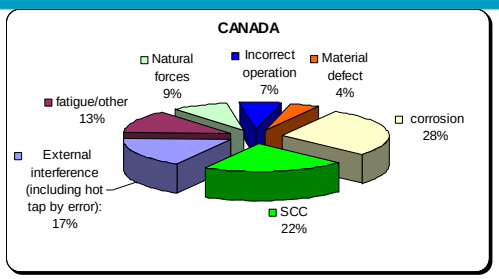

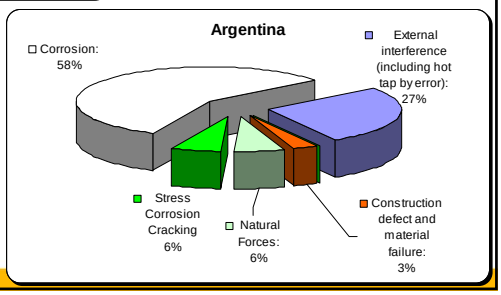

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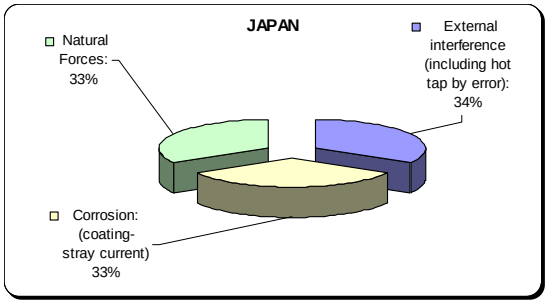

Europe :

1st) External interference " third party damages" (54%)

2nd) Corrosion (15%)

3rd) Natural Forces (Ground movements) (14%)

USA :

1st) External interference " third party damages" (34%)

2nd) Materials and construction defects (27%)

3rd) Corrosion (23%)

Canada :

1st) Corrosion (including SCC) (50%)

2nd) External interference " third party damages" (17%)

3rd) Fatigue / others (13%)

Argentina:

1st) Corrosion(including SCC) (64%)

2nd) External interference " third party damages" (27%)

3rd) Ground movements & SCC (6%)

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The most common and relevant threats in the studied geographical regions are:

•Third party damages

•Corrosion

As a preliminary conclusion, those threats should be taken into account with high priority for the developments on new technologies, because of the risk level involved.

b) Evaluation of new tools and methodologies available in the Gas Transmission industry to manage existing problems

- The information was supplied by the members, and three of them have been evaluated.

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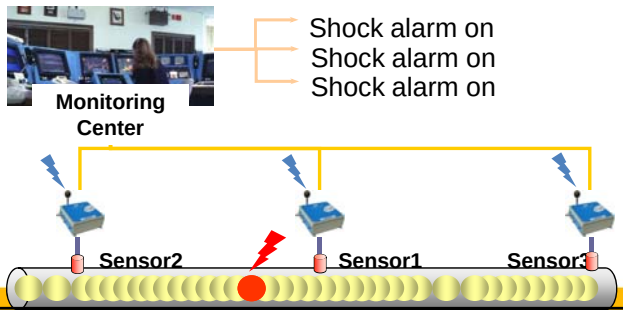
1) Third party damages – Early warning !!!

As the Third party damages is not a problem generated by the pipeline itself, but not because of the action of third parties,,,there is no way to avoid it 100%,,, and the only possibility we found was to be warned as soon as possible in order to minimize its consequences

Shock Detection Process Overview

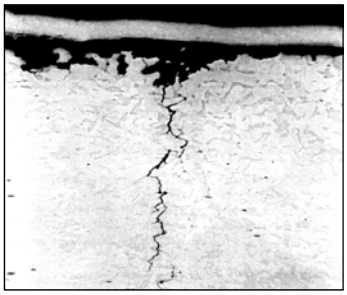


2) Susceptibility model for finding sites with hig pH SCC

1)Hydrostatic test : Very expensive and not always possible to execute.

2) ILI : There is not a satisfactory available tool for finding high pH SCC in gas pipelines yet

- **Liquid – coupled UT** too cumbersome and expensive
- **MFL + TFI** has not adequate discrimination
- **EMAT**´s possibilities still need to be demonstrated in field operation



(Magnified 250 times)

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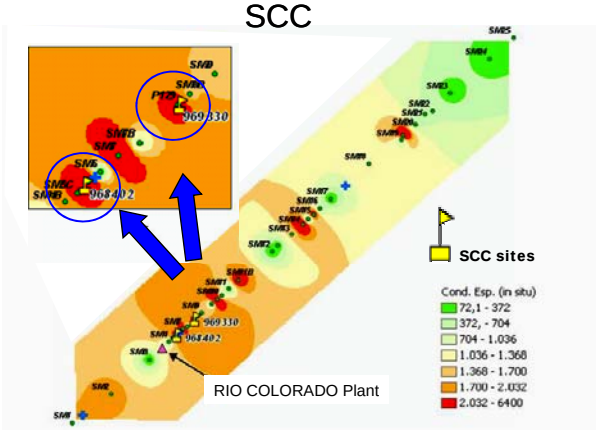
2) Susceptibility model for finding sites with hig pH SCC



So far, modeling is the most cost effective method.

3) Volumetric scanner for metal loss evaluation

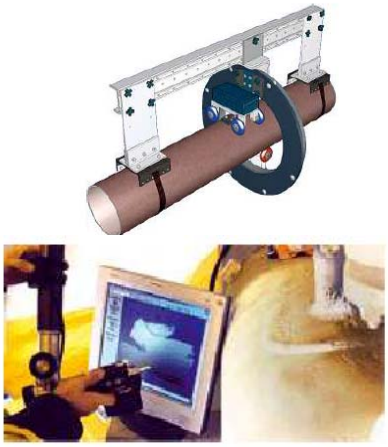


Figura 4.

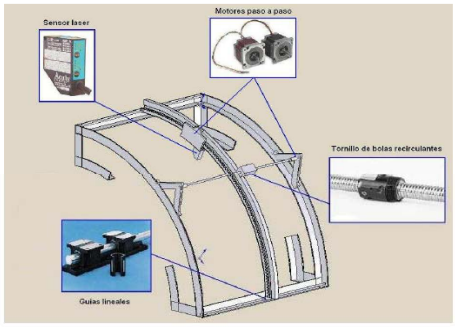


Figura 7. Bastidor curvo con barrido tangencial.

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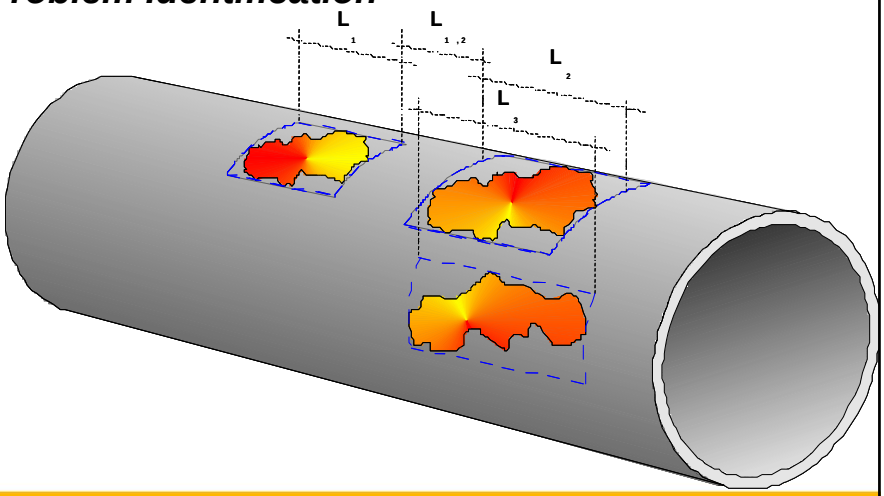
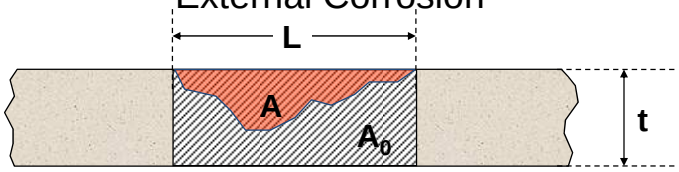
Problem Identification



Failure Stress Determination

External Corrosion



$$S_f = S \times \left[\frac{1 - \frac{A}{A_0}}{1 - \frac{A}{A_0} M^{-1}} \right]$$

S_f = Failure Stress
S = Yield Stress
A = Metal loss area
A_0 = Original area
M = Folias factor f (L,D,t)
t = Wall thickness
L = Defect length

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"Traditional " Corrosion Dimension Measurements

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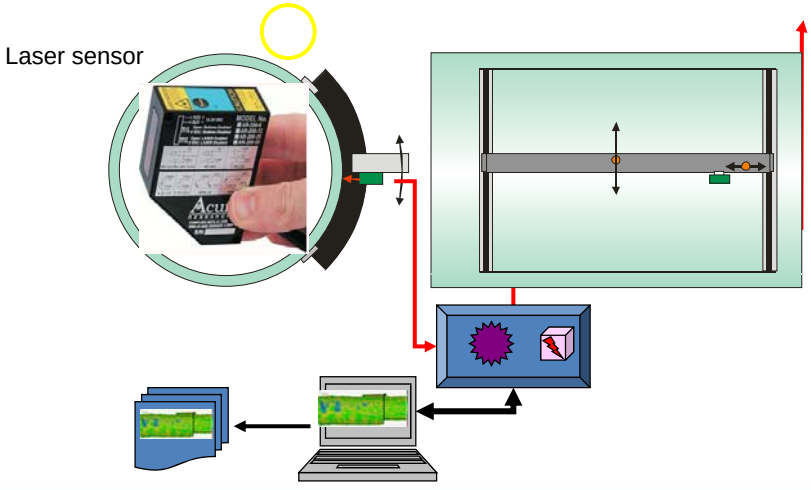

On duty..

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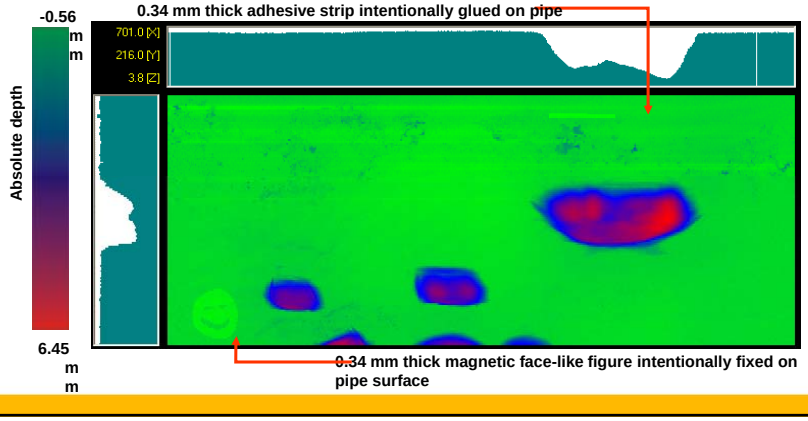
Corrosion Measurement

Results on real 30” pipe

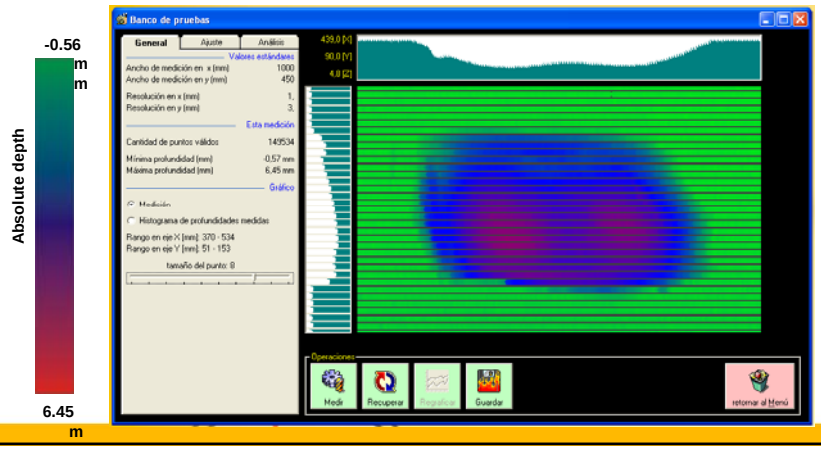
Image after automatic surface pipe identification and correction



Corrosion Measurement

Results on real 30” pipe

Zoom view of a defect



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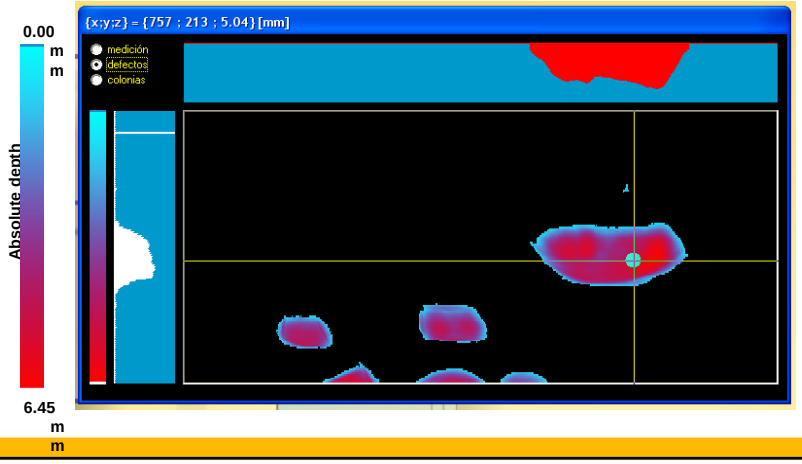
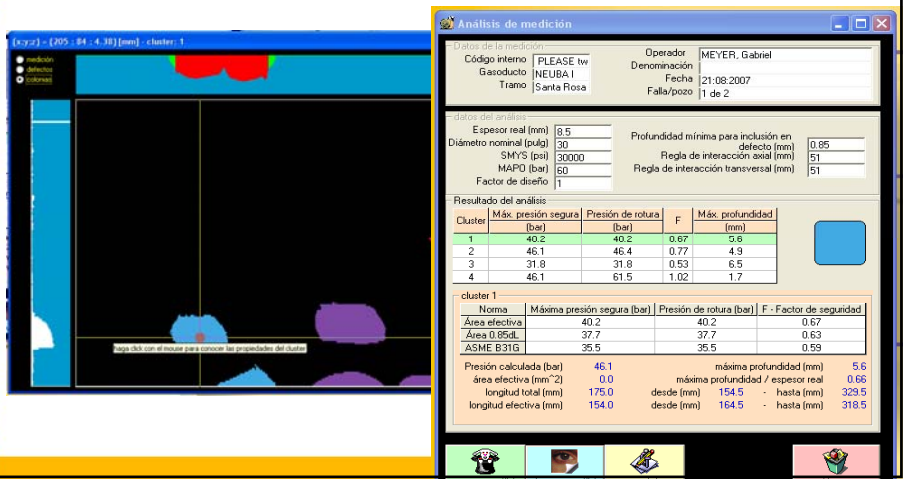
Corrosion Measurement

Automatic Defect Identification According to International Standards



Corrosion Measurement

Automatic Defect Identification According to International Standards



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As a conclusion, all the different geographical areas in the world are sharing two main threats and, despite of the fact that some special issue could be more dangerous for a particular region, helping to solve them will give the industry the most effective actions to run pipelines in a safer way.

Thank you very much!!!