HOIS JOINT INDUSTRY PROGRAMME
Improved NDT for the upstream oil, gas & petroleum industries

www.hois.co.uk
HOIS Joint Industry Project (JIP)

HOIS is a major well established JIP on best practice for NDT/NDE in the oil & gas industry

- 30+ years

Members comprise:

- Category 1 members:
  - Oil and Gas operators

- Category 2 members:
  - NDT service companies
  - NDT equipment vendors
  - The Oil and Gas Technology Centre (The OGTC), from 2017/18

- A regulatory authority (UK HSE)

Managed by ESR Technology
## Membership

Currently 41 members.

<table>
<thead>
<tr>
<th>Operators</th>
<th>Inspection service &amp; equipment vendors</th>
</tr>
</thead>
<tbody>
<tr>
<td>ConocoPhillips</td>
<td>Aker Solutions, Inspectahire</td>
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<tr>
<td>DOW</td>
<td>Applus RTD, ISQ</td>
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<td>Gassco</td>
<td>Baugh &amp; Weedon, Lloyds Register</td>
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<td>Gasco</td>
<td>Bilfinger, Mistras Group</td>
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<td>Marathon Oil</td>
<td>Bureau Veritas, Oceaneering International</td>
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<tr>
<td>Nexen Petroleum U.K. Ltd</td>
<td>CAN, Olympus NDT</td>
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<tr>
<td>Petrobras</td>
<td>Cybernetix, Rosen Swiss AG</td>
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<td>Repsol Sinopec</td>
<td>DNV, SGS</td>
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<tr>
<td>Saudi Aramco</td>
<td>Doosan Power Systems, Sonomatic</td>
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<td>Shell</td>
<td>Eddyfi, Stork Technical Services</td>
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<tr>
<td>Statoil</td>
<td>FujiFilm, TRAC Oil and Gas</td>
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<tr>
<td>Total</td>
<td>GE Inspection Technologies, The OGTC</td>
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<td></td>
<td>GUL, TSC Inspection Systems, TUV Rheinland Sonovation</td>
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</table>
What does HOIS do?

Improves effectiveness of in-service inspection for the oil & gas industry and promotes good practice

- More reliable in-service inspection – better detection of in-service degradation
- More accurate measurements of remaining wall thickness
- Provide asset owners with improved information on asset condition
- Reduce leaks and near misses

This is done by:

- Developing **good practice documents** for specific inspection applications – recommended practices and contribution to international standards which feed into company inspection procedures
- Assessment of the performance of current and developing inspection techniques by means of rigorously controlled **blind trials**
- **Industry forum** for latest developments – what’s new and what works
- Some development of **novel inspection techniques** for specialised applications
Benefits for Members

Assessment of the capability of existing and developmental inspection technologies from independent, rigorously conducted blind trials

Access to improved procedures and guidance documents on specific NDT applications

Better understanding and increased reliability of inspection

HSE active involvement

Membership of the leading forum on oil & gas in-service NDT

Networking at three main meetings a year (one hosted by a member)

Access to results from £650,000+ annual programme

Financial gearing

- Each cat 1 member’s subscription is only ~1/20th of the total budget.
- Each cat 2 member’s subscription is only ~1/65th of the total budget.
HOIS key theme: Non intrusive Inspection

Industry standard DNV-RP-G103 developed by HOIS
- Initially published 2008
- Revised version 2011
- Current HOIS project to review, significantly update and publish via DNV GL

Substantial cost savings and safety benefits from performing NII instead of conventional intrusive visual inspection
- No manned entry
- Reduced shutdown duration and costs

Also a key theme of The OGTC
Application of NII in one shutdown in 2016 – Business Benefit

28 Vessels due for inspection; shutdown scheduled for 21 days
Estimated intrusive inspection cost £1.4 million.
Following NII review - 1 required intrusive inspection.
Cost for NII inspection £450k for 12 vessels inspected.
Remaining vessels to be inspected later
Shutdown reduced from 21 days to 14 days (and pressure vessels no longer critical path).
Helped UK business unit achieve annual shutdown day target.
Increased uptime / production (c. £1M per day)
HOIS key theme: CUI and external corrosion

Major project to assess capability of NDT methods for detecting and sizing external corrosion with and without insulation

Benefitting from collaboration with the OGTC to enlarge and accelerate the project

Deliverables will include:

- Reports on results independently assessed blind trials of all current methods
- Guidance documents for in-situ inspection of scabs, with & without insulation
Recent recommended practices (RP) & guidance documents

CUPS & CUI inspection guidance (2016)

Updates to HOIS RP and new EN standard (EN 16407) for in-service digital and film radiography of pipes (2014/15)

RP for precision ultrasonic wall thickness measurements for corrosion monitoring between repeat inspections (2014)

Guidance for in-service inspection of caissons (2014)

RP for inspection of raised-face flanges (2012)

Download publicly available documents from www.hoispublications.com
## Complete list of HOIS Guidance docs

<table>
<thead>
<tr>
<th>Title</th>
<th>Date</th>
<th>Publicly available?</th>
</tr>
</thead>
<tbody>
<tr>
<td>HOIS Guidance for in-situ inspection of corrosion under insulation (CUI)</td>
<td>Nov 2016</td>
<td>No</td>
</tr>
<tr>
<td>HOIS Guidance on inspection of corrosion under pipe supports (CUPS)</td>
<td>Sept 2016</td>
<td>No</td>
</tr>
<tr>
<td>Recommended Practice for the in-service inspection of wall loss in pipes by digital radiography</td>
<td>April 2015</td>
<td>Yes</td>
</tr>
<tr>
<td>HOIS Guidance on in-service inspection and integrity management of caissons</td>
<td>July 2014</td>
<td>Yes</td>
</tr>
<tr>
<td>HOIS recommended practice for precision thickness measurements for corrosion monitoring</td>
<td>March 2014</td>
<td>No</td>
</tr>
<tr>
<td>HOIS Recommended Practice for Statistical Analysis of Inspection Data</td>
<td>April 2013</td>
<td>No</td>
</tr>
<tr>
<td>HOIS Recommended Practice for in-service inspection of RF flange faces using phased array ultrasonic techniques</td>
<td>Oct 2012</td>
<td>No</td>
</tr>
<tr>
<td>HOIS Recommended Practice for the Non-destructive Inspection of Weld Corrosion</td>
<td>July 2012</td>
<td>Yes</td>
</tr>
<tr>
<td>HOIS Good Practice Guide on in-service inspection of offshore composite components</td>
<td>May 2012</td>
<td>Yes</td>
</tr>
<tr>
<td>Non-Intrusive Inspection</td>
<td>Jan 2011</td>
<td>Yes</td>
</tr>
<tr>
<td>Recommended Practice for the rapid inspection of small bore connectors using radiography</td>
<td>Jan 2004</td>
<td>Yes</td>
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</table>
Current & recent HOIS projects

- Inspection of pipe supports
- External corrosion inspection (scabs)
- CUI inspection
- Trunnion inspection
- IVI & NII trials on two ex-service pressure vessels
- Non intrusive inspection of internally CRA clad vessels
- Updating DNV GL RP G103 Non Intrusive inspection
- Subsea inspection trials
- Inspection of composite repairs
- Guidelines for UAV/UAS based external remote visual inspection (RVI)
- Guidance for effective inspection of pipework
- Qualification of ultrasonic corrosion monitoring systems
- Human factors aspects of NDT in offshore oil & gas
Member types and subscriptions

Full member (oil/gas company) (cat 1):
- £29,850 per annum

Inspection service/vendor company member (cat 2):
- £9,950 per annum

Members gain access to all information/results generated since 1999
- In return, members need to commit to 3 years membership to avoid an up-front joining fee.

Subscription year is April 1st to March 31st
Meetings & Management

Typically three 2-day meetings per year:
- ESR Technology give technical presentations on current progress
- Opportunity for all members to review work & make recommendations on future projects and strategy

Additional working group meetings on specific projects
- As and when needed to discuss individual project in greater depth

Members propose new projects and vote on which are to be performed
Programme is determined entirely by the membership
Individual projects monitored by “Project Champions”
HOIS facilities: Warehouse for ex-service specimen storage and trials

Large and increasing collection of naturally corroded ex-service specimens for blind inspection trials

- Flange face corrosion (FFC)
- Weld corrosion
- Corrosion under pipe supports (CUPS)
- External corrosion
- Corrosion under insulation (CUI)
- Inspection of threaded high pressure non metallic pipe connections
HOIS facilities: Ex-service pressure vessels

Two ex-service pressure vessels with significant internal degradation donated to HOIS

Used for both non-intrusive inspection (NII) and internal visual inspection (IVI) trials
HOIS is a long standing JIP. Currently has 41 members

- Oil & gas operators
- HSE, the OGTC, NDT service providers & two major equipment vendors

Annual budget of £650,000+

Wide range of current projects:

- Development of Recommended practices/guidance documents
- NDT Technology evaluation by means of independent blind trials
- Addressing many current industry inspection challenges:
  - Vessel NII
  - Inspection for CUI, CUPS,
  - Inspection of composite repairs, trunnions,
  - Precision thickness measurement for derivation of growth rates