Selection of Evaluation Methods for New Weld Demands: Pitfalls and Possible Solutions

Anna Öberg, Peter Hammersberg, Lars-Erik Svensson
Content

- New demands and implementation pitfalls
- Push or pull approach
- Case study shows the approach’s effect on pitfalls

1. Background
2. Example of Implementation Pitfalls
3. Push and Pull approach
4. Case Study
5. Reflections
6. Summary
Background

- Weld standard with new demands
- Need for evaluation method
- No legal requirements on testing
- Cost sensitive
Example of Implementation Pitfalls

- Unclear or too simplified demands
- Lack of evaluation method
- Incapable method
Illustration of Components Affecting the Evaluation System

- Customers & way to present information
- Defect description & demands
- Evaluation methods
- Product & process

- The manager
- The designer
- The welder
- The programmer
Method- Push Approach

PUSHED information depending on available measuring method without customization
Method - Pull Approach

Does it matter if a push or pull approach is used?

**PULLED need for method customized depending on the customer’s information need**
Things To Consider

- Does it matter if a push or pull approach is used?
- Is the performance development dependent on more advanced technical solutions?
Penetration in Fillet Welds – Push approach

- Phased Array – available method
- Capable under certain conditions (measurement system analysis)
Weld Transition Radius – Pull approach

- Internal customer need sets requirements

- Capable for process follow up (Attribute Agreement Analysis)

<table>
<thead>
<tr>
<th>Appraiser</th>
<th>Coefficient</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0.97</td>
<td>0.0003</td>
</tr>
<tr>
<td>2</td>
<td>0.96</td>
<td>0.0004</td>
</tr>
<tr>
<td>3</td>
<td>0.92</td>
<td>0.0007</td>
</tr>
</tbody>
</table>

Table 2: Kendall’s Coefficient of Concordance Between Appraisers

<table>
<thead>
<tr>
<th>Coefficient</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.89</td>
<td>0.000</td>
</tr>
</tbody>
</table>
Reflections

<table>
<thead>
<tr>
<th>Pitfall</th>
<th>Push</th>
<th>Pull</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unclear or too simplified demands</td>
<td><em>Does not capture</em></td>
<td><em>Does not capture</em></td>
</tr>
<tr>
<td>Lack of evaluation method</td>
<td><em>Focus on existing methods</em></td>
<td><em>Finds customized methods</em></td>
</tr>
<tr>
<td>Incapable method</td>
<td><em>Becomes limited</em></td>
<td><em>Method formed by capability need</em></td>
</tr>
</tbody>
</table>

In this type of industry:

- it does matter if PUSH or PULL is used
- a less technical solution can be better
Summary

- Push or pull approach gives different effects on pitfalls
- Pull shifts focus from the tool towards the organization’s information need

A technology up-grade not necessarily creates a better system performance:
- Consider organization’s information need
- Requires other types of knowledge
Contact Details

Anna OBERG ¹,², Peter HAMMERSBERG ², Lars-Erik SVENSSON ³

¹ Volvo Construction Equipment; Arvika, Sweden; Phone: +46 16 541 64 41; e-mail: anna.oberg@volvo.com

² Department of Materials and Manufacturing Technology, Chalmers University of Technology; Gothenburg, Sweden; e-mail: peter.hammersberg@chalmers.se, annaob@chalmers.se

³ Welding Technology, University West; Trollhättan, Sweden; e-mail: lars-erik.svensson@hv.se