Shallowest Point Determination

Bsc Thesis - Presentatie

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07 July 2017
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• Subject
• Water Column Imaging theory
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Subject

How can water column imaging be an aid for wreck surveys at Rijkswaterstaat?
Water column imaging

- Definition

- Detection methods

- Resolutions
  - Along-track
  - Across-track
  - Angular
  - Range
Methodology case studies

• Scope
  - Validation of different pulse lengths
  - Wreck characteristics
  - Optimal survey plan

• Run time parameters

• Filters
Case study 1: Wreck SR7285

- Side scan sonar survey
- Diving operation
- Survey setup
Case study 1: Wreck SR7285

- Results Medium-CW – short phase ramp
Case study 1: Wreck SR7285

- Results Long-CW
Case study 1: Wreck SR7285

- Results Medium-CW
Case study 1: Wreck SR7285
Case study 1: Wreck SR7285

- Comparison table

<table>
<thead>
<tr>
<th>Line groups</th>
<th>Δ_depth(m)</th>
</tr>
</thead>
<tbody>
<tr>
<td>M_SP-A</td>
<td>-0.11</td>
</tr>
<tr>
<td>M_SP-B</td>
<td>-0.010</td>
</tr>
<tr>
<td>M_SP-C</td>
<td>-0.11</td>
</tr>
<tr>
<td>L-A</td>
<td>-0.010</td>
</tr>
<tr>
<td>L-B</td>
<td>+0.20</td>
</tr>
<tr>
<td>L-C</td>
<td>-0.010</td>
</tr>
<tr>
<td>M-A</td>
<td>+0.17</td>
</tr>
<tr>
<td>M-B</td>
<td>+0.15</td>
</tr>
<tr>
<td>M-C</td>
<td>+0.070</td>
</tr>
<tr>
<td>M-D</td>
<td>+0.070</td>
</tr>
<tr>
<td>M-E</td>
<td>+0.070</td>
</tr>
</tbody>
</table>

- Average depth difference: 0.041 m
Case Study 2: Characteristics

- The different slant ranges in one single fan view;
Case Study 2: Characteristics

- The intensity levels of wreck-targets are between -40dB up to and including 13dB;
Case Study 2: Characteristics

- A low amplitude reflection around the sounding at steel (riveted) wreck-like targets;
Case Study 2: Characteristics

- The number of low in amplitude spots below mast-like targets.
Case study 3: Wire sweeping vs WCI

- Setup
- Comparison
- IHO order

<table>
<thead>
<tr>
<th>Method</th>
<th>Shallowest depth (m)</th>
<th>Point(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wire</td>
<td>4.75</td>
<td>Inapplicable</td>
</tr>
<tr>
<td>WCI</td>
<td>4.85</td>
<td>2</td>
</tr>
<tr>
<td>Comparison</td>
<td>-0.10</td>
<td>Inapplicable</td>
</tr>
</tbody>
</table>
Conclusions

• Comparison between near absolute and WCI-data

• IHO standards for wreck-like surveys using WCI

• Optimal survey methodology

• **How can water column imaging be an aid for wreck surveys at Rijkswaterstaat?**
  - Primary tool
  - IHO special order
  - Wreck-like target characteristics
Recommendations

- Different weather and environment types
- FM pulse in comparison with CW pulses
- New nautical chart symbol
Vragen?