Executive Summary

Innospection has carried out an internal Magnetic Eddy Current (MEC) inspection on the client’s caisson. MEC is the next generation and improved version of Saturation Low Frequency Eddy Current (SLOFEC™). This report details the inspections which were carried out during the inspection campaign.

The MEC™ inspection of the caisson commenced on 13th of March 2014 during which time the 36 metre section was scanned internally. Due to high marine growth at the lower section was not possible to scan as planned however, no significant defect were found on the scanned areas.

All MEC™ Scans are shown in Appendix 1.

A summary of the inspection findings in each of the scanned section is given below:

<table>
<thead>
<tr>
<th>No.</th>
<th>Pipe zone No.</th>
<th>Caisson Length (mm)</th>
<th>Comments</th>
<th>Max % Wall Loss in Pipe Section</th>
<th>Overview</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1</td>
<td>15,000</td>
<td>External Corrosion</td>
<td>&lt;30%</td>
<td>Mainly small corrosion areas approx. 10-20mm Very minor indications &gt;50%</td>
</tr>
<tr>
<td>2</td>
<td>1</td>
<td>15,000</td>
<td>Internal Corrosion</td>
<td>&lt;30%</td>
<td>Mainly small corrosion areas approx. 10-20mm Very minor indications &gt;50%</td>
</tr>
<tr>
<td>3</td>
<td>2</td>
<td>15,000</td>
<td>External Corrosion</td>
<td>&lt;30%</td>
<td>Mainly small corrosion areas approx. 10-20mm Very minor indications &gt;50%</td>
</tr>
<tr>
<td>4</td>
<td>2</td>
<td>15,000</td>
<td>Internal Corrosion</td>
<td>&lt;30%</td>
<td>Mainly small corrosion areas approx. 10-20mm Very minor indications &gt;50%</td>
</tr>
<tr>
<td>5</td>
<td>3</td>
<td>6,000</td>
<td>External Corrosion</td>
<td>&lt;30%</td>
<td>Mainly small corrosion areas approx. 10-20mm</td>
</tr>
<tr>
<td>6</td>
<td>3</td>
<td>6,000</td>
<td>Internal Corrosion</td>
<td>&lt;30%</td>
<td>Mainly small corrosion areas approx. 10-20mm</td>
</tr>
</tbody>
</table>

The caisson was inspected in three zones with the lowest zone scanned first, middle zone second and top zone third.

Signal Y-component/angle analysis window set for indication of internal defects with approx. depth information.

Overall 30% max wall loss internal and external only minor indications of >50%

30% max wall loss internal and external

750mm from top of caisson

1000mm
1.0) **Inspection Volume**

The MEC™ Scans were taken over 360° coverage of the caisson. This report focuses on a 36m section of the caissons. The seam welds including the heat affected zones were not scanned due to the limit of the technique scanning welds in perpendicular direction.

All accessible areas of the caisson were targeted for inspection with the exception of specific dead zones, which could not be inspected due to the design of the scanner i.e. the wheels of the scanner butted against a circumferential weld bead.

The Dead Zone refers to the following areas:

2.0) **Inspection Equipment**

2.1) **MEC™ Equipment Marinised PS200**

The inspection system consisted of the following MEC™ Equipment and accessories.

**Scanner** : MEC™ Marinised PS 200 (width 200mm)

**Description of Scanner** : The MEC™ Marinised PS 200 is a winch driven system, consisting of a scanner head with eight individual eddy current sensor coils each with a width of 25mm, these coils being mounted to provide an internal circumferential array covering 200mm of the internal bore. The sensors are supplied and controlled by a multiplexed electronic system feeding data to an eddymax computer. The scanner head is adjustable in height for lift off.

Each side of these coils are fitted two DC electromagnets powered by an 110v DC amplifier variable power supply.

A multiple regulated electric winch system is used to pull the scanner through the caisson. A pulley system (sheave wheel) fitted to the umbilical supply is connected to an encoder for the calculation of accurate distance travelled.

**Scanning Speed** : 100% (approx.: 24m/min)
Eddy Current Instrument: IBM-AT-compatible computer with 2-frequency Eddy current plug-in cards.
Type: eddyMax Beltronic

Eddy Current Sensors: 8 x EC-B-25 mm

Software Version: EddyMax Eddy Current Multiplex Software Version 5.10.05.27

Winch with Cable: The winch that operates the scanner is fitted with a 150m umbilical and is operated with 110v power supply, via a remote control unit.

Reference Plate: External and internal set of two samples. 36" x 16mm WT Carbon Steel from Innospection. 36" x 16mm WT Carbon Steel from Innospection.

Reference defects: Grove (depth 10%) for sensor conformity setting. Flat Bottomed holes Ø 12.5mm, 25mm and 50mm. Depth 20%, 40%, 60% and 80%. Through Wall holes Ø 6mm.
Remarks
No severe wall losses.
Maximum wall loss up to 30%. Very minor indications of >50% wall loss
(In comparison to calibration).

Caisson was inspected in three zones with the lowest zone scanned first, middle zone
second and top zone third.

Very small amount of red
indications highlighted with red
circles are >50% max wall loss

Signal component: High red circles relate to indication of usual
decomposition within depth ortable.
Remarks

No severe wall losses: Maximum wall loss up to 30%. Very minor indications of <10% wall loss (in comparison to calibration).

Caisson was inspected in three zones with the lowest zone scanned first, middle zone second and top zone third.

Very small amount of red indications highlighted with red circles are >50% max wall loss.
Remarks
Overall no severe wall losses. Maximum wall loss up to 30%. Very minor indications of <50% wall loss (in comparison to calibration).
Caisson was inspected in three zones with the lowest zone scanned first, middle zone second and top zone third.

Very small amount of red indications highlighted with red circles are >50% max wall loss.
Internal Scan Report Zone 2

Remarks:
Overall no severe wall losses. Maximum wall loss up to 30%.
(In comparison to calibration)
Caisson was inspected in three zones with the lowest zone scanned first, middle zone second and top zone third.
External Scan Report Zone 3

Remarks
No severe wall losses:
Maximum wall loss up to 30% (in comparison to calibration)

Prevented from inspecting at the end due to marine growth at lower end of the caisson

Splash zone fine at the time of inspection as this point on the occasion
Internal Scan Report Zone 3

Remarks:
No severe wall losses. Maximum wall loss up to 30%
(In comparison to calibration)
Caisson was inspected in three zones with the lowest zone scanned first, middle zone second and top zone third.

Signal Amplitude [V]

-25 25 35 45 55
0.0 0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5 5.0

* Sample of the signal amplitude and its indication (D) of wall thickness