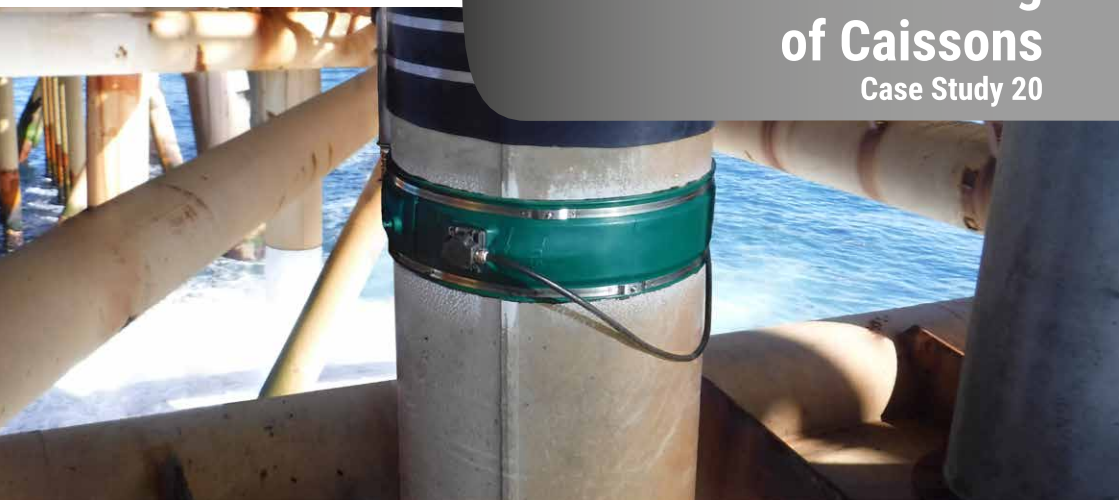
GUIDED ULTRASONICS LTD.

Guided Wave Monitoring of Caissons

Case Study 20



Caissons

Pump caissons are used to bring sea water on to offshore platforms, either for water injection or as fire water.

There have been many instances where rapid corrosion in the caisson has resulted in complete failure and the lower portion of the caisson has collapsed to the sea floor. The fall of such a large object represents a significant risk to sea floor infrastructure, which in turn generates risk to the life of the people on the platform and can have a large environmental impact in the event of oil or gas release.

Equipment

Wavemaker® gPIMS Collector

gPIMS® Ring

gPIMS® Monitoring

After the successful screening of nine caissons using Guided Wave Testing (GWT), it was concluded that caisson monitoring could be much improved by using guided wave permanently installed monitoring sensors or gPIMS®.

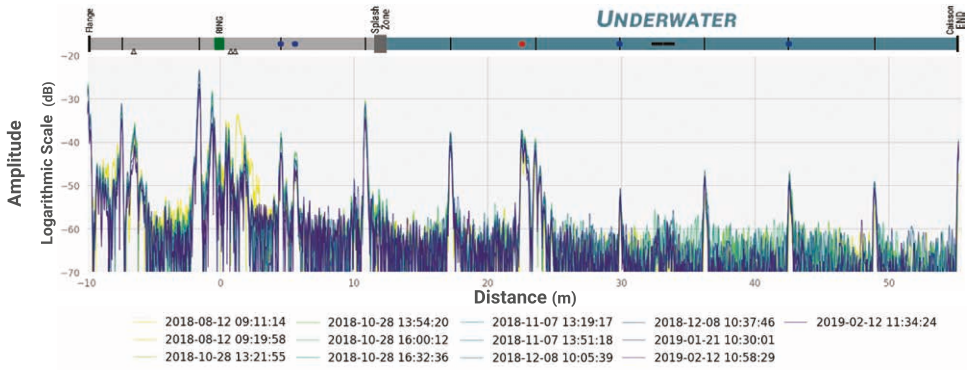
Two caissons were selected for installation of the gPIMS® system, placing the sensors at the same location used for the initial screening: approximately 10m above the splash zone. Cables from the sensors were run through conduits to the lower deck of the platform, where the sensor connection boxes are easily accessible. Currently data is being collected by a minimally trained operator using a portable instrument.

gPIMS® provide two distinct sets of information: thickness and GWT data. Thickness of the steel directly under the sensor is measured at 8 circumferential locations allowing detection and rate determination of corrosion mechanisms that occur uniformly, regardless of axial position. The GWT data allows to monitor the changes occurring at some distance from the sensor, typically areas that are not easily accessible.

Caisson Monitoring

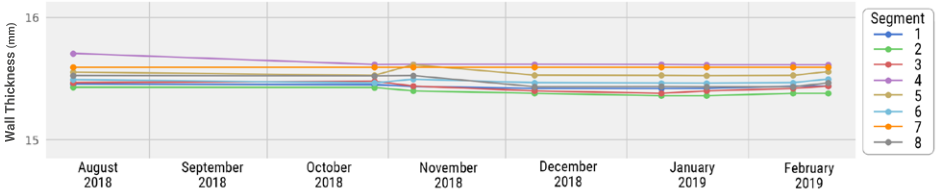
Advantages of Guided Wave Monitoring

WavePro™ Results



gPIMS® GWT Results. Comparison of data taken over 6 months indicates condition changes have been minimal.

gPIMS® Wall Thickness Measurements

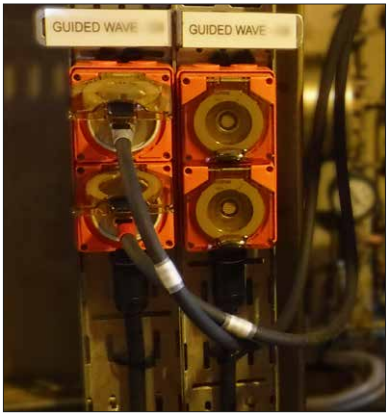


Dual Capacity. gPIMS® provide wall thickness measurements directly under sensor for 8 circumferential positions.

Improved Results

The GWT and Thickness Measurements plots for one of the two caissons are shown above. It can be seen that thickness has not changed substantially in this period. Minor changes have been detected in the GWT data at the location of one of the caisson's guides, caused by some remedial work done to prevent the caisson from moving in the guide.

The data obtained with the gPIMS® compares very well with the initial screening result (see results of Caissons screening in Case Study 18). However, the increased signal amplitude from the gPIMS® has resulted in a significant increase in test range, which allows monitoring of the condition of the full length of the riser: from the top flange - 20m above sea level - to the bottom of the caisson - 45m below sea level.



gPIMS® Connection Boxes. Installed in an easily accessible location for frequent data acquisition.

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2019CaseStudy20_rev0 Aug/2019

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