

## Sustaining the Technical Integrity of Caissons Through Inspection & Maintenance

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The deterioration and failure of caissons, especially firewater and seawater lift pump caissons, has been a problem for Oil Exploration & Production operators in the North Sea. Many of these caissons carry submersible pumps, either firewater or seawater lift pumps whilst others are simply used for overboard discharge.

The deterioration in the integrity of caissons occurs usually due to one or more of the following factors: dissimilar material corrosion between pump system and carbon steel caisson, mechanical abrasion between caisson and pump string or guide as well as general corrosion due to coating breakdown (especially within the splash zone).

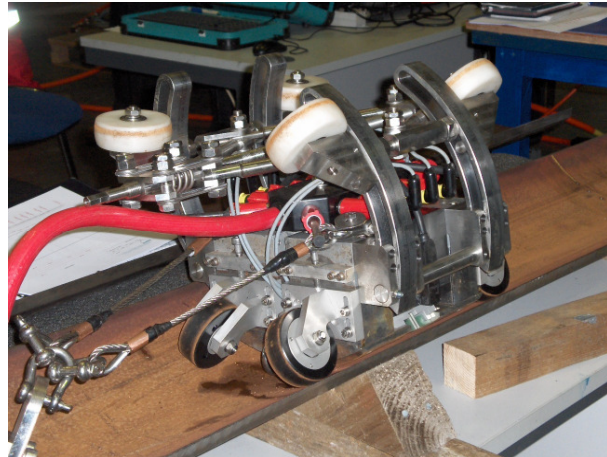
High priority caisson repairs are carried out using swaged liners which is a steel sleeve that is plastically deformed within the caisson to bridge the area of damage. For pump caissons, when the pump is withdrawn from the caisson in preparation for the repair, the opportunity is taken to undertake further inspection to ensure that all areas of deterioration have been detected as well as implementing remedial actions to eliminate the root cause of deterioration.

The typical cost of implementing a major caisson repair is in the order of £650K in comparison to £150K for those caissons that are less critical and where preventive measures are adequate. Timely intervention is therefore essential not only to ensure that the caissons which are in critical conditions are repaired to prevent failure but also to implement remedial actions to the less critical caissons to prevent further deterioration and to avoid major repairs being required in the future.

An improved range of inspection tools has been developed to reliably detect all forms of deterioration either above water, within the splash zone or in subsea.

One such example is the development of an Internal Caisson Inspection Scanner (see picture on the right) by Innospection Ltd.

This scanner allows data to be collected for the complete length of the caisson, thus allowing a thorough integrity assessment to be undertaken.



Because of the success of the Internal Caisson Inspection Scanner, **this tool has been used to undertake an extensive inspection program in 2007 on behalf for Shell Exploration & Production – Europe.**

Sustaining the integrity of the caissons in the long term is the key to avoiding costly repairs. Maintenance and inspection routines should be implemented to ensure that the technical integrity of the caissons is safely sustained.