

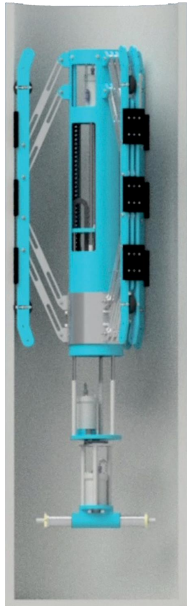


## SPECIALIST INSPECTION SERVICES 1. 沉箱内检查-专利技术（内窥镜检查）

Stork's Specialist Inspection division are an established and technology driven team with a rich heritage of delivering safe, efficient and innovative inspection solutions. With over 20 years' industry experience, Stork provides clients with accurate, clear and valuable data on caisson, riser and j-tube inspections.

This is in addition to our advanced and conventional Non-Destructive Testing (NDT) methods and innovations; such as internal laser profiling. All of Stork's Specialist Inspection tooling has been designed with maximising efficiencies for our clients at the forefront of our minds. Our newly developed Caisson Inspection Tool boasts the following benefits:

- Motorised centralising:** With the centralising being motorised, this allows for better deployment past restrictions found within some caissons (liners for example). Being electrical rather than hydraulic also reduces the manual handling requirements, as well as negating the need for more umbilicals having to be deployed. This compared to being hydraulically powered, allows the operator total control of the tool from the offshore laptop.
- Scan length:** The new tool can scan 500mm in axial length, reducing scanning time; as it covers twice the length of previous versions.
- Twin probes:** Stork's system is comprised of two UT (Ultrasonic Testing) probes. This lessens the scanning required to half the rotational amount, improving scan time efficiency, while still retaining total coverage of the item being inspected. The probes have a 180° offset therefore only a 180° sweep is required to capture the full 360° of wall thickness data.
- Backwards scanning:** Stork's state-of-the-art equipment also scans backwards. This makes it more efficient to negate the time taken to retract the axial per scan, rather than having to wait for it to retract after finishing every scan; again improving scan time efficiency.
- Motorised probe arms:** The motorised probe arm enables modifications of the ID ranges, meaning the tool is capable of scanning whilst in-situ. This eliminates the requirement to recover the tool to make adjustments; again reducing setup time and increasing efficiencies on the job, whilst ensuring both probes have the same stand-off distance as each other, from the internal surface of the inspection item.



## SWAGE REPAIRS 2. 沉箱内壁修理-专利技术

In the past, the supply chain arena has been limited with regards to caisson repairs, however Stork has brought an integrated, state-of-the-art solution to the marketplace. Through significant research, investment and resources, Stork has developed and deployed swage repair tooling. The technology and associated Finite Element Analysis (FEA) are DNV-GL accredited, further demonstrating our proven repair solution.



### Innovation

- Improved swage technology.
- Cost reduction for required liners.



### Assurance:

- Independently assessed.
- Risk Based Inspection planning and implementation.



### Features

- Improved efficiency of swage i.e. can effectively swage a range of caisson thicknesses without the need to vary liner section thickness and grade.
- Pressure-driven, retractable centralisers to ensure the tool is fully concentric with the liner throughout the swaging operation.
- Both digital and manual monitoring and tracking of pressure/volume during swaging operation ensuring full control of the swage quality.



### Safety

- Fully function and load tested.
- Robust HSE culture embedded throughout operations.



### Knowledge

- Front-end engineering FEA has been successfully performed and was based on common North Sea caisson sizes, from a range of 20" - 36".



### Benefits

- Fast and effective repair method.
- Multi-disciplined team, reducing personnel on board, whilst delivering to the highest quality standard.
- Availability of tool for the work scope can be controlled in-house.
- Full connection strength of each swage repair will be proven by manual and FEA calculations on a case by case basis.
- Competitive
- Strong HSEQ culture implemented throughout operations, ensuring safe working practices are adhered to.
- Environmentally friendly and pollution free.

