



Green Technologies

Independent advice and coordinated implementation



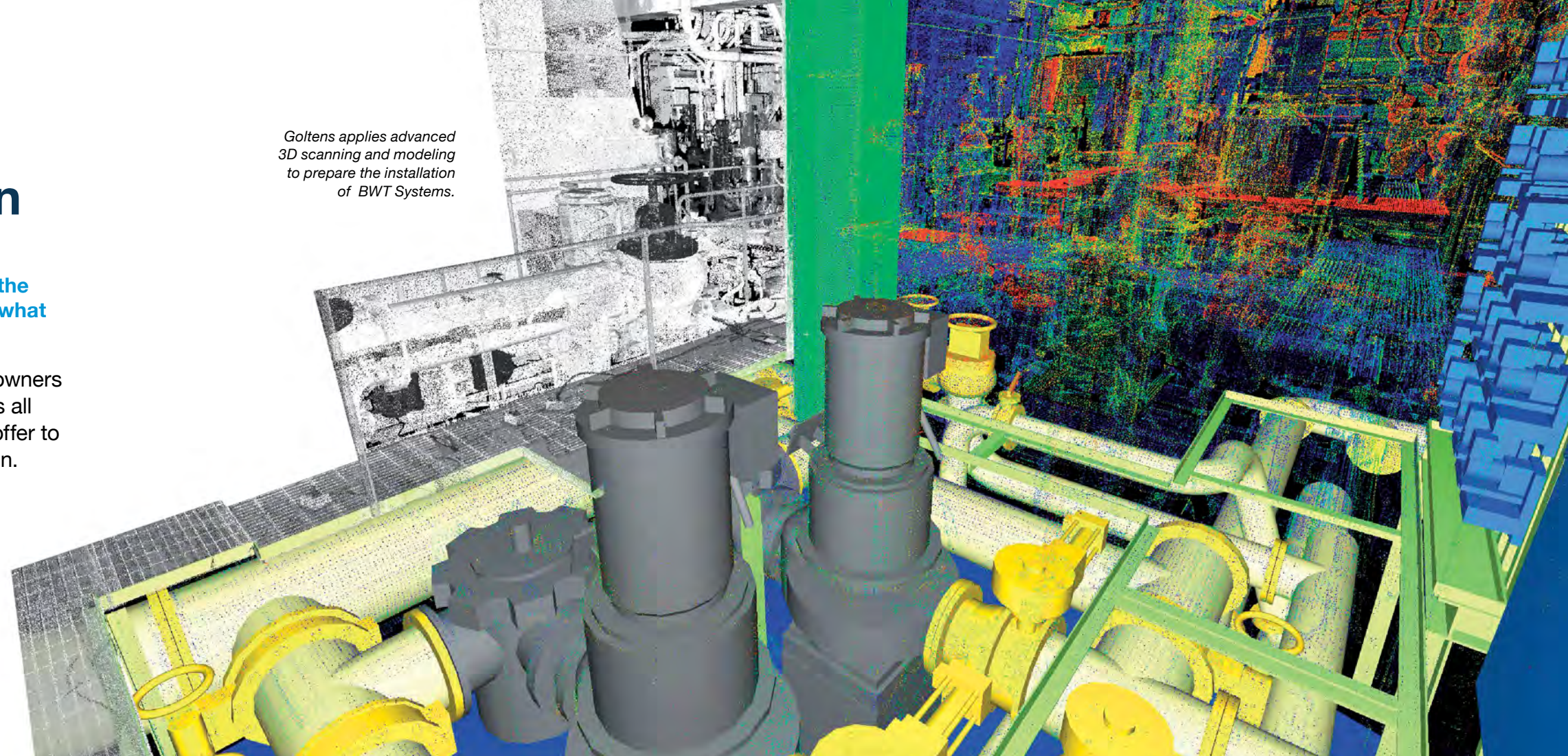
Decision support for smarter implementation

Selecting the right technology is hard enough. Getting the timing and implementation right is even harder. This is what makes experienced, independent advice valuable.

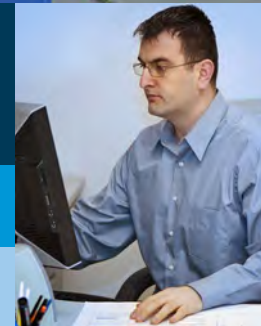
Goltens is a highly qualified discussion partner for asset owners in assessing new and unproven technologies. The makers all strive to have the best solution – our job is to relate their offer to the challenge of upgrading vessels already in full operation.

Ballast water treatment is one of many new technologies being made mandatory by international regulations in the years to come. An array of solutions, deadlines creating booming markets, the need to coordinate implementation across a fleet of vessels in operation around the world creates an environment where Goltens is feeling at home from day one.

Goltens applies advanced 3D scanning and modeling to prepare the installation of BWT Systems.



BWT System Guide Plan



Shipowners' key considerations

- **CAPEX and OPEX**
- **Available machinery space**
- **Available electrical power**
- **Ballast pump capacity and normal operating practices**
- **The ability of a system to work in fresh, cold or turbid water**
- **The impact of the potential need to treat on both discharge and uptake**
- **Ease of system maintenance and spare parts logistics**
- **Special needs such as EX proof requirements and chemical storage**
- **Where to tie-in to existing pipework**
- **How to get the equipment in place**
- **Whether or not installation can be performed at sea.**

Every ship is unique

Step 1: Goltens provides shipowners with the decision support they need when selecting a ballast water treatment system. Key considerations are space, power, ballasting capacity, voyage patterns and special requirements such as the need for meeting EX requirements.

Plan, then work

Step 2: An onboard survey to make a visual inspection of where to tie-in the system, take measurements and optionally make a 3D laser scan of the installation space ensures that subsequent engineering design is based on the actual configuration of the ship. Often, particularly for older vessels, existing drawings are inaccurate. The survey is also used to evaluate how the system can be brought on board and whether or not it will be possible to undertake all or part of the installation on voyage.

Pre-engineering

Step 3: Back at the engineering centre, pre-engineering work is carried out to identify the key design issues, check load balance, modify ballast diagrams and prepare a detailed quote.

There will be no surprises for the shipowner after this detailed analysis and the feasibility of the chosen system will be confirmed.

Smooth integration

Step 4: A detailed design phase includes preparation of the isometric drawings of piping and the construction drawings to meet class requirements. A part list and an updated ballast water management plan will also be prepared.

Goltens has established a reputation for delivering highly skilled teams for the most critical repair projects that shipowners have. Our experience with class requirements and our on-going analysis of the technologies and legislative requirements helps shipowners achieve the milestone of class approval as smoothly as possible.

Measure twice, cut once

Step 5: Purchasing of equipment and prefabrication of piping and foundations is made simple by the thorough specifications already developed. Assorted ancillary materials such as cabling and valves are included in the purchasing to ensure there are no delays once installation commences.

Installation worldwide

Step 6: Goltens can provide installation, commissioning and crew training services worldwide. Our services include full electrical installation.

Minimising operational downtime can involve various approaches in the way the installation stages are conducted including partial work done during drydocking, alongside or at sea. Worldwide availability of Goltens' installation teams means voyage patterns can be maintained with minimal disruption.

A service partnership

Step 7: Possibly the most critical step long-term, Goltens provides on-going support and service worldwide.

Goltens Green Technologies aims to be a long-term partner to shipowners as they meet the growing number of environmental requirements being enacted by IMO. In the future, these services will be expanded to cover equipment such as air emissions abatement and other technologies.



**To meet new environmental regulations
Goltens plans and installs green
technology solutions that prolong the
life-time of valuable assets.**

As a leading independent global provider of ship repair services, Goltens has constantly been presented with new problems by ship owners with one main objective – keep the vessel in operation. Installing a new BWT System is just another in a long row of challenges.

Protecting the environment and safeguarding oceanic ecology is only possible if the existing fleet can effectively be upgraded. Our experience in critical repairs, our global footprint and close relationship to yards and OEMs gives us a unique position towards this challenge.

We have chosen to take an independent role towards the equipment makers and side with the owners to be part of the well-planned and swift upgrade of the existing fleet to meet the upcoming regulations.

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