

Ship Building i n d u s t r y

Strandriderna

KBV 001

Capewater

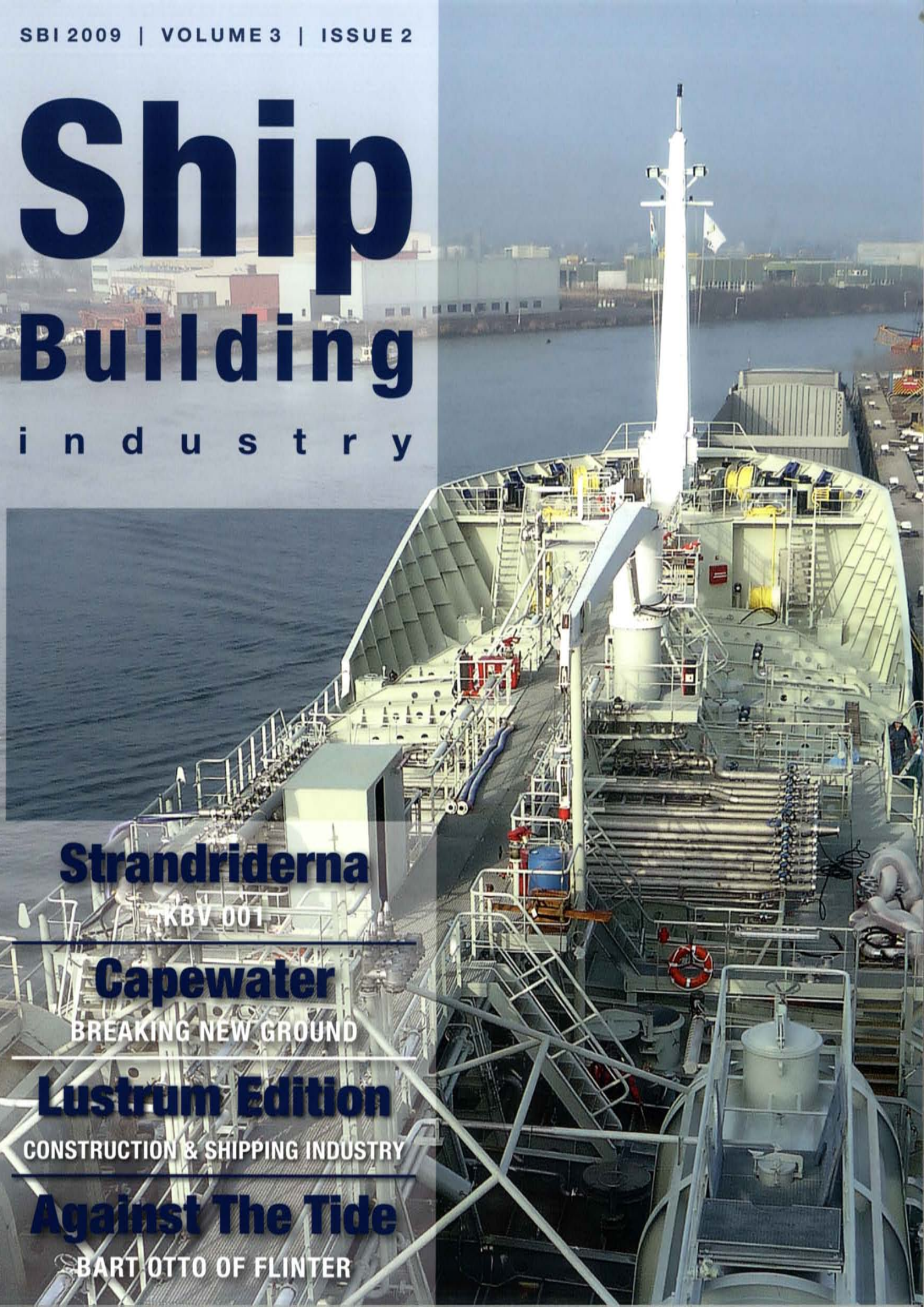
BREAKING NEW GROUND

Lustrum Edition

CONSTRUCTION & SHIPPING INDUSTRY

Against The Tide

BART OTTO OF FLINTER



Clean Ahead Full

Meeting Annex IV

The amended Annex IV not only applies to newbuilds with a gross tonnage of more than 400 GT of which the actual build starts next year. The new standards also apply to newbuilds of less gross tonnage, that are certified to carry more than 15 crew and passengers. Also sewage treatment plants delivered by contract on 1 January 2010 or later for already existing vessels, have to follow the 'Revised Guidelines on Implementation of Effluent Standards and Performance Tests for Sewage Treatment Plants'. Last but not least, they also apply when there is no set contract date for delivery of the treatment plant, but the actual delivery date is on or after New Year's Day 2010.

Triqua

But although the MEPC.159(55) demands are more stringent and supersede the earlier MEPC.2(VI) recommendations, the technology to meet the requirements that come into effect next year is actually already available. Wastewater treatment



contractor and operator Triqua, located in Wageningen, the Netherlands and part of the multi-utility company Delta NV, has its answer in place. From its origins dating back to 1996, Triqua has pioneered advanced membrane bioreactor technology and has since then established her name at the forefront of industrial, communal as well as offshore and maritime wastewater treatment worldwide.

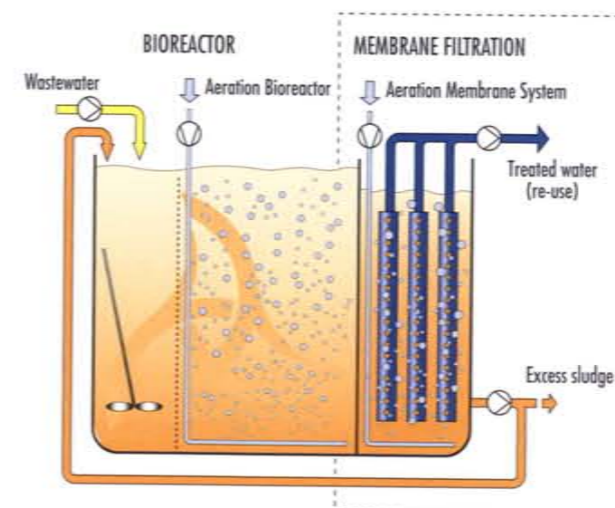
SubTriq Marine

To enable ship owners to comply with the upcoming demands, Triqua has added the SubTriq Marine system to her portfolio. This standardized submerged membrane bioreactor package provides a sewage water treatment solution onboard vessels supporting a population of up to fifty. The SubTriq Marine system is based on Triqua's core technology: membrane bioreactor filtration. Membrane bioreactors (MBRs) are based on the conventional activated sludge process in which the organic content of the wastewater is reduced by organisms that combined with aeration form a precipitate. By using membrane filtration the formed suspended solids and micro-organisms are separated from the treated water. Subsequently, the treated water is suitable for re-use – depending on its purpose further treatment may be required – or can be discharged. Within the SubTriq membrane bioreactor system the separation process is performed by so-called submerged membrane filtration, meaning the membranes are submerged directly in the bioreactor. By 'integrating' the actual membrane filtration in the bioreactor the system remains very compact, which is of course an important advantage onboard vessels, where space is at a premium. The actual filtration is 'powered' by applying a vacuum to the inside of the membrane. Fouling of the membrane is prevented by establishing a steady flow of air bubbles along the outside membrane surface, guaranteeing trouble-free uninterrupted operations over long periods.

Tailor-Made

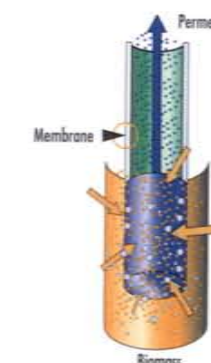
Although the SubTriq Marine system aims at treating wastewater for up to fifty people, this is by no means the limit for marine applications. For accommodation barges and

The MEPC.159(55) Resolution amending the MARPOL 73/78 Annex IV sets new standards for the performance of onboard sewage treatment plants. Newbuilds will have to adhere to the amended Annex IV regulations by the start of next year.



Submerged filtration

$\Delta p = -0,1 \text{ bar}$

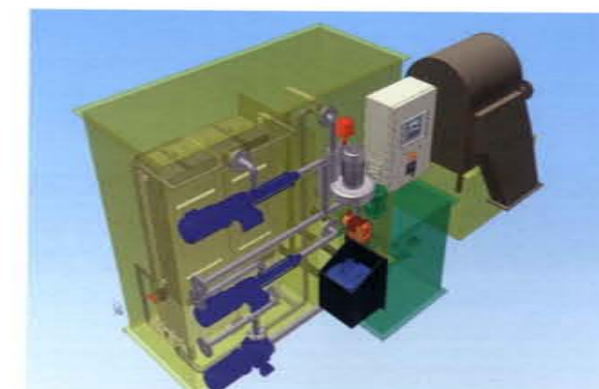


offshore platforms for instance – often supporting populations of several hundreds of people – other membrane bioreactor solutions can be provided. From its pioneering heritage, Triqua takes on every challenge posed by a potential customer, not only to answer his or her needs by delivering tailor-made treatment solutions but also to explore new market opportunities.

This in a sense comes with the territory. Wastewater treatment can be characterized by a significant amount of parameters that have to be taken into account. There are for instance the different solid and soluble ingredients, determining the composition of the wastewater. Together with the desired state of the treated water, this determines the solution which means selecting the right membrane, selecting a possible pre-treatment and/or post-treatment. The question whether the treated water will be fit for re-use has of course a large say in this matter as well.

Right Solution

For Triqua, coping with wastewater of all possible sources – be it maritime be it industrial or municipal – also means dealing



with directives, rules and regulations from just as many different sources, and again introduces an additional parameter in selecting the right solution. The EU Water Framework Directive on integrated river basin management for Europe, the EU Directive on port reception facilities, IMO rules and governments around the world imposing additional demands aimed at for instance special areas of great



environmental importance, these are only the environmental demands Triqua's solutions have to answer to. In the Khazakistan sector of the Caspian Sea there are for instance severe discharge restrictions in place to protect the breeding grounds of sturgeons, posing limits to the discharge temperature of treated water and to its contents. Here and already since 2001, Triqua has supplied their membrane bioreactor solution to an array of contractors operating accommodation and drilling barges.

All Standards

And then there is of course the operating environment itself. There is nature to reckon with. In Kazakhstan and for instance on the Russian island of Sakhalin temperatures can fall as low as -40°C in winter, while peaking at over $+40^{\circ}\text{C}$ during the summer. Oil and gas operations set their additional safety standards coping with working equipment in a surrounding where explosion and fire safety are of the utmost importance. On board vessels, the equipment has to withstand vibrations and shocks as well. Uninterrupted operations have to be guaranteed at all times. Relating to quality, safety and operations there are also CE regulations to adhere to which in Russian are overruled by GOST-R and in Kazakhstan by GOST-K certificates of conformity to meet local rule. With regard to vessel operations, Triqua's MBR-solutions meet all relevant IMO/MARPOL standards and are certified according to the Russian Maritime Register of Shipping (RMRS). Complementing all health, safety and environmental (HSE) regulations concerning the wastewater treatment solutions provided, Triqua personnel holds all relevant personal HSE certificates – including Basic Offshore Safety Introduction Emergency Response Training according to NOGEP 0.5A – that will ensure after sales services.

Onboard Treatment

All in all, Triqua is able to manage all parameters governing successful wastewater management and has proven this in

practice on land and water around the world. Both the Belgian and the Royal Netherlands Navy are operating Triqua MBR systems. Also the world's largest single-masted superyacht Mirabella IV relies on Triqua's MBR technology to handle wastewater. Meeting environmental standards clean ahead full.

i. www.triqua.eu

