



# Green Bulkers Now and in the Future

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## 1. COMPANY PROFILE

Grontmij A/S was founded in 1915 and is a multi disciplinary consulting & engineering company with 350 offices located worldwide. Grontmij's head office is located in the Netherlands. Grontmij's Marine department has been designing ships since 1966. The department consists of 30 naval architects and marine engineers and has offices located in Copenhagen, Odense and Shanghai. Grontmij's Marine department is experienced with ship design of all types such as tankers, bulk carriers, container ships, gas carriers (LPG / LNG / LEG), Ro-Ro vessels, ferries, off-shore vessels and special purpose vessels.

## 2. SEAHORSE 35 – CASE STUDY

The Seahorse 35 is a double hull bulk carrier currently under construction at 7 different shipyards in China. The first of approx. 60 orders was delivered to the Owner in August 2011.

A green bulker requires certain factors in order to be green. Grontmij defines those factors as:

- low emission
- reuse of energy
- effective propulsion system
- ballast water treatment system
- Opex and Capex optimization
- lines and capacity optimization related to fuel consumption
- light weight optimization
- energy saving devices

How low can we go on emissions for a Seahorse 35 with existing known green technology?

The primary modifications would be:

- Optimized propeller
- Twisted spade rudder with Costa bulb
- Water in fuel (WIF)
- Exhaust gas recirculation (EGR)
- Waste Heat Recovery System (WHR)
- Exhaust Gas Scrubber
- Ducted/direct air intake for main engine
- Optimized coolers and cooling pumps
- Auxiliary engine operation on marine diesel oil (MDO)
- High capacity fresh water generator
- Installation of Ballast Water Treatment System (BWT)

### 3. GREEN DESIGN HOUSE

In order to ensure a green bulk design Grontmij works towards:

- Optimized designs
- Weight saving studies
- Propulsion systems
- Use of High Tensile Steel
- Following developments within Green Technology
- Tank test with new features

### 4. FUTURE DEVELOPMENTS

Grontmij always works towards optimization and focus our designs to meet future requirements. Some future developments could be:

- Sails
- Solar cells
- Fuel cells
- Using weather forecast to optimize route planning
- Low friction systems
- New painting systems
- Trim optimization

*Leif Jacobsen is Department Director of **Grontmij Marine Department** since 2009. Amongst others his responsibilities include sale and promotion of the Double Hull Bulk Carrier Seahorse 35 including the implementation of green technology. He held a master's degree in Engineering from the Aalborg University, Denmark and a diploma in Business Administration from the Copenhagen Business School. He started his professional career at the engineering consultant Rambøll and gained experience in many offshore and onshore projects as project Manager and Project Director. He changed to Grontmij in 2008 where he initially acted as Department Director before he was entrusted with his today position.*