

Sleipnir LNG

The largest crane vessel in the world on clean fuel



Heerema is frontrunner in the Offshore Construction Industry in embracing LNG as marine fuel. The newest addition to Heerema's fleet - the Sleipnir - has numerous features that reduce its impact on the environment and increase sustainability, including the use of LNG as fuel.

Currently under construction in Singapore, it will hit the markets in 2019 as the most sustainable heavy lifting vessel in the world. Compared to heavy fuel oil, carbon emissions are reduced by approximately 20%, while other emissions are reduced by almost 95% or more!

SLEIPNIR'S SUSTAINABLE VALUES

Efficient

- ✓ Heat / cold energy re-use
- ✓ All LED lights
- ✓ Variable frequency drives
- ✓ Equipment condition monitoring
- ✓ Silicon based anti-fouling paint
- ✓ Thrusters under a horizontal angle for optimum DP performance
- ✓ Energy efficiency included in operational procedures
- ✓ Vacuum toilet system for low potable water consumption
- ✓ Glass Reinforced Epoxy piping for weight reduction and durability



Clean

- ✓ Dual fuel engines, MGO / LNG
- ✓ Shore power (11kV) ready
- ✓ Selective catalytic reduction with urea injection for NOx reduction
- ✓ Advanced oxidation technology ballast water treatment
- ✓ High performance oil / bilge and deck water separation
- ✓ Focus on minimizing waste streams
- ✓ Sewage treatment including membrane filtration
- ✓ Waste management plant



Safe

- ✓ Continuous involvement of HMC operational personnel in design
- ✓ Detailed design includes:
 - operational and technical safety studies
 - prevention of dropping objects in any locations
 - man-machine interfaces and ergonomics



Silent

- ✓ Frequency controlled fans with noise attenuators
- ✓ Cooling water discharge below water
- ✓ Major rotating equipment on anti-vibration mounts and stiff locations
- ✓ Propellers designed for very stable behaviour
- ✓ Innovative pile driving noise reduction techniques



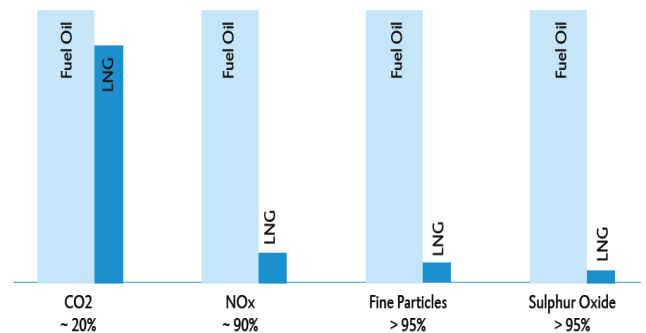
Sleipnir

- ✓ Two cranes of 10,000 tonnes lifting capacity each
- ✓ DP Class 3
- ✓ Sailing 10 knots without tug assistance
- ✓ LR ECO Notation including additional requirements



**We act sustainable because we want to.
Not because we have to.**

The Sleipnir boasts numerous other features, apart from the reduction of emissions due to the usage of LNG. It is completely outfitted with LED-lighting, has a heat/cold energy recovery system, equipped with variable frequency drives and state-of-the-art silicon based anti-fouling paint to name just a few. The sustainable design philosophy, implemented as early as 2013, clearly showcases Heerema's dedication to sustainability beyond simply compliance. It shows that we act sustainable because we want to. Not because we have to.



Visit hmc.heerema.com/sustainability for more information

Detailed Information

For over fifty years, Heerema Marine Contractors has been a leading marine contractor in the international offshore industry. As such, Heerema is involved in managing the entire offshore construction supply chain, from design through to completion. Heerema delivers full offshore field development in some of the toughest marine environments on the planet. Our Services are divided into three product groups: Oil and gas, Decommissioning and Renewables. In 2013, HMC decided to enhance its fleet with a new heavy-lift vessel with increased capabilities. This vessel, called the Sleipnir, is presently under construction at Sembcorp Marine's Tanjong Kling and Tuas Boulevard yards in Singapore.

As sustainability and innovative solutions often go hand in hand in the offshore industry, HMC actively leverages technology to achieve both outcomes. HMC has implemented many innovative solutions and operational best practices throughout its fleet that promote responsible consumption, efficient operations and reduction of environmental impact. These include:

- Use of underwater bubble curtains to lower the noise level generated by underwater hammers during pile driving in order to protect wildlife;
- Introduction of LED lighting on board our vessels. LEDs have a much longer lifespan and are 60 percent more energy-efficient;
- Use of biodegradable oil in areas where there is oil-to-sea contact;
- Use of ultra-low sulphur Marine Gasoil (MGO);

- Waste separation on board our vessels to ensure that the waste can be recycled, incinerated or disposed of responsibly.

The Sleipnir is an exemplary fact of this mindset and a pioneer in sustainability in its own right. Currently in the final stages of construction at Sembcorp Marine's yards, the Sleipnir will be the largest semi-submersible crane vessel in the world. It comes equipped with two revolving cranes with a lifting capacity of 10,000 metric tonnes each. Artist's impressions of the Sleipnir in front of the Marina Bay Sands and with respect to the main Office in Leiden are provided on the next page, showing the impressive size of the vessel. Sleipnir is designed with many 'green' features, as shown in the infographic on the previous page. Perhaps the most notable innovation is that the Sleipnir will be the world's first offshore construction vessel to implement a dual-fuel system, allowing the vessel to use Liquefied Natural Gas (LNG) for power generation. LNG is much cleaner (very low emissions of NOx, SOx and particulate matter) than conventional fuels.

Despite a challenging business climate, Heerema has taken the bold decision to go forward with the construction of the largest crane-vessel in the world, the Sleipnir. This strategy appears to be paying off, as HMC has already booked a project for 2019 and several others from 2020 onwards for which Sleipnir's record breaking lifting capacity is required. Sleipnir's unique features, are attracting quite a significant number of projects currently in the market. For our clients, there is great value in being able to lift bigger packages as this reduces the time it takes to install, complete and commission offshore platforms.

Artist Impressions

For Illustration Only



Sleipnir when compared to the Aegir and HMC Main Office in Leiden



Sleipnir in front of Marina Bay Sands, Singapore