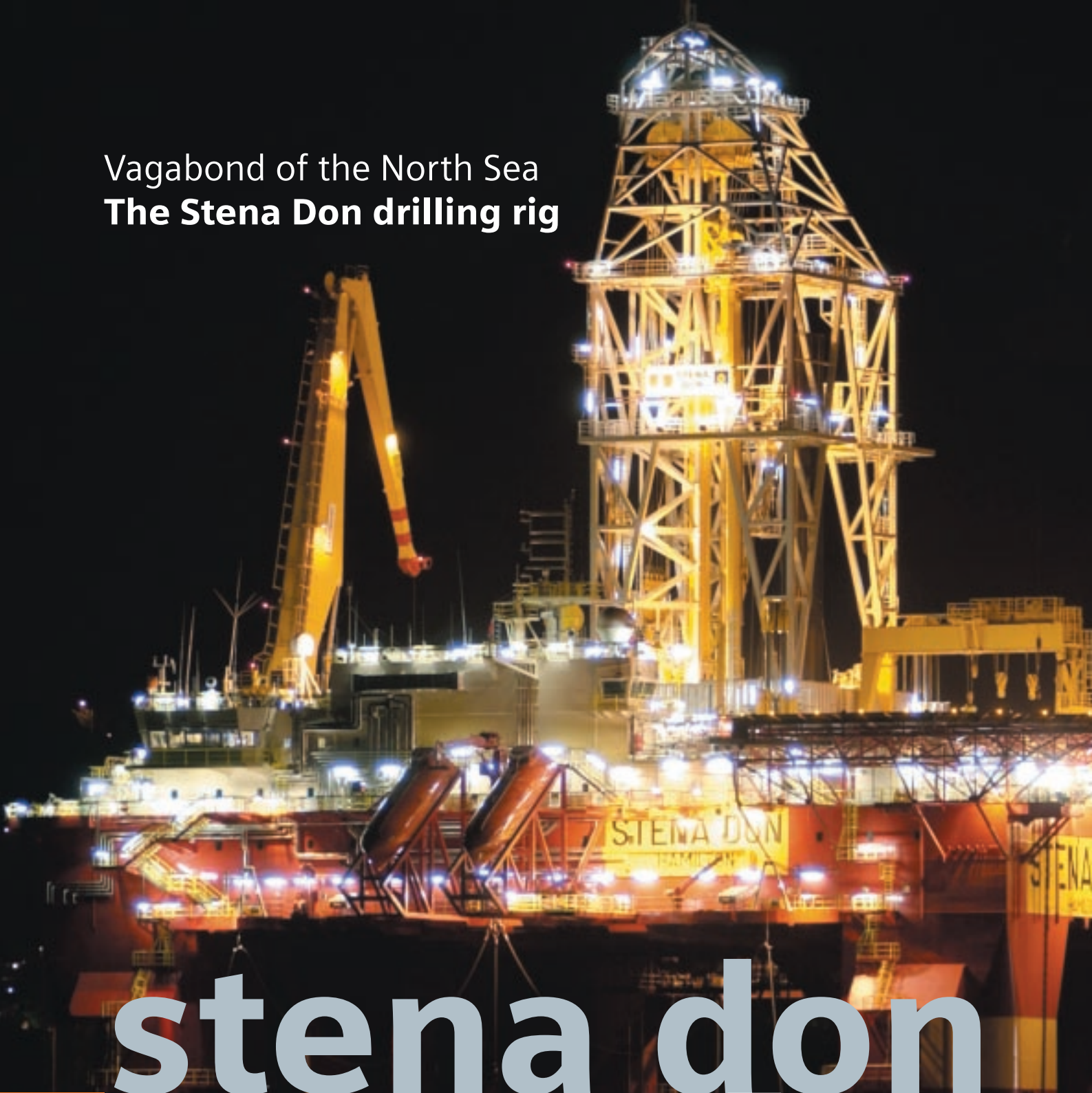


Vagabond of the North Sea
The Stena Don drilling rig



stena don

SIEMENS

Siemens equips this self-propelling, dynamically positioned drilling platform

Stena Don, an absolutely state-of-the-art self-propelling service and research drilling platform has gone into service in the North Sea. It can be positioned to an accuracy of a ~~meter~~ thanks to a sophisticated partnership between a dynamic positioning system and variable-speed drives. In addition to the navigation and drive technology, Siemens supplied the complete automation and process control technology, the electric power generation as well as the telecommunications.





The Stena Don oil drilling platform was constructed for the Stena Drilling Company, at home in Scotland. It is about 100 meters from the keel to the top of the rig, has a 67 x 72 meter large platform and is designed for depths of up to 500 meters. Thanks to its rugged design, Stena Don can be deployed anywhere in the world – in the North Sea as well as in warmer tropical waters.

Perfect interaction between all components

Siemens used variable-speed drives and a highly developed navigation system to fulfill the high requirements so that the Stena Don can be positioned to an accuracy of a meter – and that under any weather conditions.


The navigation system was developed in cooperation with ~~Königsberg~~ Simrad, a supplier for this type of equipment. This allows the drilling rig to assume the intended position under its own power. It uses various sources: GPS data from satellites, an acoustic beacon, which is located on the sea bed, and a taut steel cable which also stretches down to the sea bed. The angle of this steel cable to the vertical is continually monitored, allowing position devia-

tions to be determined. Six azimuth thrusters are used to make the necessary course corrections when positioning. They also propel the Stena Don from one site to the next.

When the Stena Don has to move, ballast water is pumped out of the pontoons, the drilling rig rises by several meters and it can then propel itself through the North Sea. By pumping out ballast water, the energy consumption when moving is reduced. When the Stena Don arrives at the new site, the platform is again lowered by pumping ballast water into the pontoons.

Each of the 6 thrusters has a drive system comprising a Geafol epoxy resin transformer, a Siemens high-voltage motor with an output of 3300 kW (shaft output) and a SIMOVERT® MV medium-voltage converter for closed-loop speed-controlled operation.

Precise and energy-saving

Closed-loop speed-controlled operation not only allows the motors to be precisely controlled and in turn the drilling rig  also extremely cost-effective. For the same power, in some cases up to 50% energy can be saved as the motor only draws as much power as it actually requires.

A SIMOVERT MV AC drive converter controls the speed and is the first converter in its output class which is equipped with HV-IGBT power semi-conductors. The HV-IGBT (High-Voltage Insulated Gate Bipolar Transistor) is the only component in its class which can be operated without any supplementary circuitry. When used in conjunction with the three-level inverter, this allows an especially simple design: Modular, space-saving, extremely reliably but at the same time still service-friendly.

Together with the gating, the HV-IGBT modules form an intelligent switching unit which guarantees optimum drive converter protection – for example, by limiting or interrupting short-circuit currents. The use of HV-IGBT's in conjunction with the 3-level technology and the powerful Transvektor control guarantees sinusoidal motor currents. These sinusoidal motor currents reduce the motor losses and minimize torque fluctuations – reducing the stressing on the complete mechanical transmission line.

Siemens large drive systems are optimally harmonized with one another which means that SIMOVERT MV can be operated together with Siemens high-voltage motors without requiring a special output filter. The three-phase high-voltage motors also increase the reliability of the overall system thanks to their rugged design.





Three-phase drives now also for the drilling assemblies

The Stena Don is the first drilling rig where three-phase technology is also used for the drilling aggregates. Up until now, only DC drives were used for the drilling aggregates due to the simple closed-loop speed control capability. However, the maintenance costs for DC drives are significantly higher than for three-phase drives as a result of the commutator wear. Furthermore, mechanical commutation causes voltage spikes. SIMOVERT MASTERDRIVES® AC drive inverters are used to control the speed of the low-voltage drilling motors and various pump drives.

Intelligent energy management

The Stena Don drilling rig is classified as EO which means that it has unmanned machinery rooms. The automation system on the platform includes fully-automatic power generation, distribution and supply systems for the platform. This Power Management System controls and monitors the complete onboard supply therefore providing a significant energy-saving potential. It also determines the actual energy requirement by interrogating the power drawn by large loads, which then allows the generators to be appropriately started and stopped. The load is also optimally distributed between the generators which are synchronized with one another. This is all complemented by protective functions – for instance overcurrent, overload, underfrequency and short-circuit protection.

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