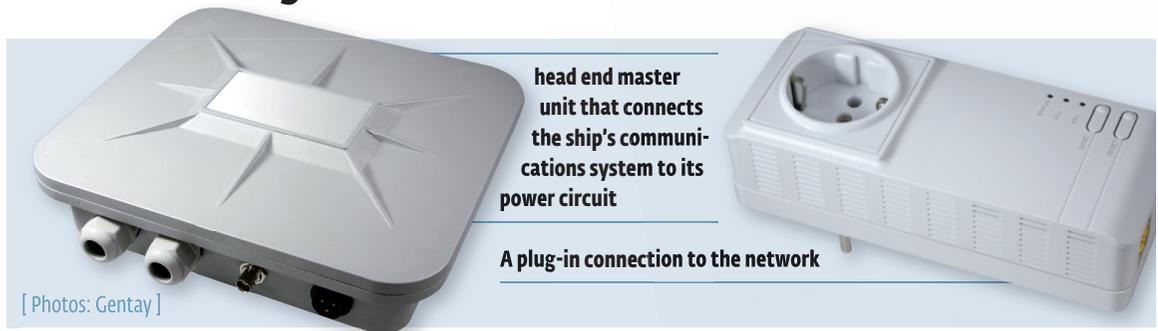


technology

Power cables carry onboard broadband

Ships are already wired for broadband – through their electrical circuits

Installing a broadband network on board a ship is a costly business, thanks to the expensive cabling needed, the ducting and cutting through bulkheads to install it. But a wireless network may not be a solution either, because of all the metal surfaces interfering with the signal.



[Photos: Gentay]

head end master unit that connects the ship's communications system to its power circuit

A plug-in connection to the network

However, trials taking place on the 22,201 dwt bulk carrier *Aino Dake*, managed by Wallem Ship

Management are producing encouraging results for an alternative network option that

“costs virtually nothing to install”, its developers claim. It uses the ship’s existing

Gas two-stroke’s efficiency on show

Tests on MAN B&W’s ME-GI engine start as marketing begins

A test engine using LNG had its first public running in late May at MAN Diesel & Turbo’s Diesel Research Centre in Copenhagen.

The engine builder had invited hundreds of potential customers to a briefing about its achievement.

The test engine had been modified to test the engine builder’s two-stroke ME-GI engine concept, which is said to offer dramatic reductions in emissions and can be applied across the

company’s two-stroke range. No orders have yet been placed and, from the few questions that the tight timetable allowed, the risk of gas leaks was a significant concern for many of those present.

The concept is not without supporters, however. It features in the Quantum 9000 container

ship concept developed by class society DNV (*Fairplay*, 24 March 2011, p26) but it would be suitable for other ship types, such as tankers and large bulk carriers.

The engine will run on either 100% fuel oil or LNG – with a small proportion of pilot fuel oil – and offers the same efficiency as ME and ME-C along with better SFOC figures, said Ole Grøne, senior vice-president for low-

MAN peddles the diesel cycle

Using the two-stroke diesel cycle gives the ME-GI engine significant advantages over the Otto cycle used in four-stroke engines, argues Søren Jensen, vice-president and head of R&D for marine low-speed engines at MAN Diesel & Turbo.

He set out the comparative merits of the systems in the table (right), but emphasised the importance of gas leakage control and the lack of methane slip in the diesel cycle. For example, he said, the cylinder is scavenged with clean air and the compression cycle is also done with clean air, so there is no gas near the stuffing box, with gas and pilot oil being injected when the piston is near top dead centre.

Diesel cycle

- Unchanged power density
- Unchanged load response
- Avoids knocking
- No methane slip
- High-pressure gas

Otto Cycle

- Power reduction or increased cylinder bore
- Load ramp needed
- Pre-mixed combustion process
- Methane slip 2-4%
- Low-pressure gas

[Source: MAN Diesel & Turbo]

electrical power cabling as the network so “you simply plug the devices into the power socket and it works”, Martin Nygate, director of the UK company, Gentay, which is promoting the system, told *Fairplay*.

He relayed a message from the ship’s superintendent that read: “Please be advised that new networking is working well even during cargo operation with ship’s cargo gear.”

and business applications ashore – Nygate has one in his own home – but this is the first BPL installation at sea, he believes.

“A ship is just an office block on its side,” he said. “You simply plug the devices into the power sockets and it works.”

Installation can be done by the ship’s own engineers, he said.

Asked whether power surges posed a problem, he said the technology is immune from them,

Solutions for Vessels’ [iPOP: internet protocol over power-line]. An iPOP head end unit is installed on the bridge and connected both to the vessel’s satellite communications system and to the power grid.

Once connected, a wired or wireless access point can be established “from any location on board the vessel where there exists a power cable and junction box”, Nygate said in a statement when the system was launched last month.

That statement also suggested other applications for the network: “We are adapting complementary products to take advantage of the ability to install low-cost networks on board vessels,” Nygate went on. These include low-cost CCTV IP cameras to monitor various operation and security vantage points, which could help address piracy threats.

The network could also be used

to convey data from various locations back to the bridge for onward transmission ashore.

It can also be used to augment existing cabled networks, he pointed out, for example when security cameras are installed or crew internet access is added.

Other applications

Other potential applications the company has identified include voice over IP (VOIP), video telephony, personnel mustering and interactive door/bulkhead sensors. Work is in hand “to develop these configurations for practical use”, the company notes in a report about its ship trials, seen by *Fairplay*.

That report included figures suggesting “the bandwidth that this technology achieves rivals that of conventional networks”. This is true even between bridge and engine room, which was assumed to be the longest distance of data transfer. ■

The alternative network option costs virtually nothing to install



A wireless link that plugs into the power network

The technique is known as broadband via powerline (BPL) and is already used in domestic

“as it has in-built redundancy”.

The system is being marketed as ‘iPoP – Wireless Network

speed promotion and sales at MAN Diesel & Turbo. If orders were placed now, it could be fitted to ships due for delivery from mid-2013 or for retrofits from the end of 2012, he assured guests.

Design modifications include an emphasis on preventing gas leaks, with double-walled piping delivering the gas and seal designs that have drawn on 10 years of experience by MAN B&W licensee Mitsui in an onshore power plant in Japan between 1994 and 2003.

“Making a system that is long-term gastight is complex,” said Søren Jensen, vice-president and head of R&D for marine low-speed engines at MAN Diesel & Turbo to *Fairplay*, paying tribute to Mitsui for sharing its experience. That “saved years of development” he remarked.

Methane is said to be a powerful greenhouse gas so the

Large gas storage; compact delivery

Providing fuel for a gas engine requires different technology from that needed to handle fuel oil, from specialised delivery systems to larger bunker tanks.

MAN Diesel & Turbo’s Research Centre has installed a proprietary high-pressure fuel gas system (HP FGS) manufactured by Daewoo Shipbuilding & Marine Engineering (DSME), which was described in the presentation documentation as very compact. It “eliminates complicated boil-off gas treatment systems for container ship and tanker applications”, the notes added.

JungHan Lee, vice-president of DSME, said the HP FGS needed only a low-power pressuriser leading to a simple supply system. This is the result of a decade of development, he said.

Locating the bunker tanks would depend on the ship type, he said. For the Quantum 9000 container concept developed by DNV, for example, the gas tanks would be located beneath the superstructure, and thus not reduce cargo capacity. For large ore carriers, in which the cargo volume is comparatively small, the tanks could be located in the void spaces along the ship’s sides, while tankers could mount them on deck, provided there were no visibility problems.

engine’s design and its fuel delivery system have been conceived to eliminate ‘methane slip’ – unburned gas escaping to the atmosphere. Gas pipework, for example, is double-walled, with a sensor to detect any gas

leaking into the space between them. During the engine’s demonstration, this condition was simulated, prompting the engine control system to immediately switch from gas to fuel oil. ■

JungHan Lee, vice-president of DSME: Gas storage options will depend on the ship type [Photo: Paul Gunton]