Radical thinking helps Maersk clean up its act

AP Moller-Maersk aims to be at the forefront of sustainable shipping. Steve Matthews talks to the head of Maersk Maritime Technology, Bo Cerup-Simonsen

Top: Bo Cerup-Simonsen.
Middle: Tesco in the UK, and an Ikea store in Beijing. Maersk is working with these two leading customers to improve green standards in the supply chain. Bloomberg
Bottom: the 7,000 teu containership *Mathilde Maersk* at the Odense Shipyard, Denmark, after its naming ceremony in February. Maersk has achieved a 7.7% fuel saving from changes to the bulbous bow design.

SHIPOWNERS are coming under increasing pressure to implement more sustainable and less environmentally damaging ship designs and operating practices.

For AP Moller-Maersk, being at the forefront of sustainable shipping involves some radical new thinking, alongside major changes to the process of contracting newbuilding ships.

Maersk believes that there is a commercial competitive advantage to be gained in being ahead of the game in meeting likely future regulatory requirements for greener ships.

The company says its aim is to achieve eco-efficiency beyond compliance through more efficient use of resources, leading to lower emissions and discharges. This means adopting a policy of pro-active mitigation of environmental risk.

The task of implementing this strategy in practice falls largely to Maersk Maritime Technology. Its head Bo Cerup-Simonsen described it as "an innovation department that is actively monitoring ships' performance and regulatory developments".

Speaking recently to members of the International Association of Maritime Economists in Copenhagen, he revealed that his unit has been set a target to reduce the Maersk fleet's carbon dioxide emissions per teu-km by 20% by 2017 from the 2007 level. He said that the company had already achieved a 15% reduction from 2002 to the present.

Mr Cerup-Simonsen said that Maersk believes that sustainable environmental solutions go hand in hand with competitive solutions. This is because of a combination of increasing customer demands, tighter and more complex regulations and energy costs increasing in the long term, driving the need for greater efficiency and new technologies. "In time the greener solutions will be more competitive."

As well as customers increasing their demands, employees and other stakeholders will also expect the company to adopt more environmentally friendly behaviour. Environmental regulations will inevitably tighten with increased scope and tougher emissions limits. Traditional 'grandfathering' principles — in which existing vessels escape new rules — will be questioned, forcing the adoption of new technologies. This will give an advantage to owners that comply in advance of new rules coming into effect.

With new emissions rules coming into force and the Copenhagen climate change conference in December likely to result in new CO_2 emission regulations, Maersk anticipates a decade of major change that will result in new designs, giving green ships a competitive advantage over standard designs.

It hopes that the principle of goal-based standards rather than prescriptive standards will be applied so "we can be flexible and innovative as to how we can meet them".

Customer preference is increasingly driving development of a greener supply chain with consumers demanding greener suppliers. Therefore, environmental performance not only affects costs, but also income as customers favour green suppliers. "Customers are benchmarking shipping companies' environmental performance, including CO_2 emissions," he said.

"We are working with leading customers, including Tesco and Ikea, to achieve higher standards and there will be increasing competition between shipping companies on environmental performance.

"Our ambition is to be an environmental leader, so we are encouraging our customers to differentiate in favour of environmentally friendly options. It is not about getting a premium on the freight rate but recognising shippers' preference."

This new competitive aspect is causing leading shipping companies to devote more resources to developing solutions to meet this requirement. On the technology front the main focus is on reducing fuel consumption, generating cost savings and cutting emissions.

"We are looking at all options to save energy, no matter how small, but also including operational decisions and vessel design," Mr Cerup-Simonsen said.

"We are turning every stone with regard to innovation and application of technology, including container cooling, hotel loads, operational decisions, cargo operations, aft hull and propeller design, auxiliary machinery, anti-fouling and drag reduction and bow bulb design.

"Innovation of technology and business models is key to competitive and environmental shipping."

Maersk conducted a detailed analysis of CO_2 emissions for all its ships. This showed a wide scatter of performance, sometimes by as much as 30% even for ships of similar size. These differences are attributed mainly to variations in design. "So we have a big scope for improvements," he said.

Many of the principles that Maersk is seeking to implement are being incorporated in a new series of 7,500 teu, 93,600 dwt containerships being built by Daewoo in South Korea. The series of 16 ships will be delivered from 2011 through 2013. Mr Cerup-Simonsen told Lloyd's List that they will be deployed mainly on routes from South America to Europe and Asia.

New design features will generate estimated overall fuel efficiency savings of 23% compared with a standard design.

Mr Cerup-Simonsen said that these savings derive mainly from changes to engine and propulsion systems, a revised hull shape and installation of a waste heat recovery system.

He said that optimised ship design was key to achieving the savings compared with a standard vessel of the same size. "Normally the shipbuilder optimises the contract based on a specified speed, draught, capacity and so on. But for these ships we wanted to optimise the ships to our operational requirements."

In this way, he revealed, Maersk achieved a 7.7% fuel saving from changes to the bulbous bow design. "Containerships normally operate at a lower draught than the design draught so that the bulb is partly out of the water, reducing efficiency, so we optimised the design to ensure that the bulbous bow is lower in the water to improve efficiency and reduce fuel consumption.

"The next thing was to de-rate the main engine so it operates at lower revs per minute and therefore takes less power.

"To achieve this we had to have a larger diameter propeller, and find room for it, to achieve higher efficiency, so we changed the stern design to accommodate it. We saved 3% fuel consumption on the engine and 5% from the propeller."

A further 9% of fuel consumption was saved by investing in waste heat recovery.

Overall, these changes produce a 23% fuel saving compared with a standard vessel. Maersk estimates that the improvements applied to all 16 ships will save 180,000 tonnes of fuel a year, 550,000 tonnes of CO_2 emissions and $50m in costs.

Mr Cerup-Simonsen acknowledged that Maersk would pay a significant cost premium on the normal contract price for this type of ship, though he declined to say how much. He did say that the payback period was between five and 10 years depending on the fuel price.

"We calculated the cost of the design features using cost/benefit analysis and the payback period against the fuel consumption and CO_2 emission savings," he said. "We are in business for the long term and this is a long-term investment."

He added that these principles would also be included in other vessels, with designs focused on operational principles. "It will affect the way we contract our ships with shipyards so that they will be based on specific operational criteria. This trend will spread across the industry," he said. "It takes investment, engineering and a pro-active approach to do this. Yards will have to find ways of accepting these concepts, to include fuel efficiency and environmental friendliness rather than just price."

Maersk is also looking at other areas of research and development including anti-fouling coatings, pumps, propeller design and route planning.

"We are looking at a whole range of technology solutions," Mr Cerup-Simonsen said.

RECENTLY, attention has focused on the concept of ultra-slow steaming. Mr Cerup-Simonsen said that for containerships the minimum operating cost was at a speed of 10 knots with the engine operating at 10%-15% load. But engine manufacturers did not encourage operators to run ships at that reduced load and for some engines there was a risk of damage from prolonged running at a low load.

"Recently some manufacturers say that it is possible in certain conditions. This gives more flexibility operationally and we will see increasingly that more ships will operate at 10%-15% engine loads," Mr Cerup-Simonsen said.

"Ultra slow speed steaming is a real achievement. Going down to 10% load on engines is expanding the operational window so ships can select the speed that will get them to port just in time, so a lot of energy can be saved. The industry will move towards the optimisation of speeds."

Looking further ahead, Mr Cerup-Simonsen said that Maersk was looking at the possibilities of liquefied natural gas-powered engines, which are cleaner. "They need support such as supply facilities in ports, but we see potential for this developing on a large scale."

The most eco-efficient ship designs will consider all the available technologies to generate maximum benefit for the environment and the business. This will be based on a ship design that optimises the level of fuel efficiency with maximum business value within the limits of investment, internal rate of return and return on investment.

This focus on operational and environmentally sustainability will become more widespread, he predicted. "We will move into a period, whether you buy or charter a vessel, when its environmental performance will be more important in contracting, in addition to getting a good and cheap ship," he said. "Operators will look at ships they own, but also ships they charter in this context."