

# Flexible feeders can be carbon light

Power company ABB asked ship designer Knud E. Hansen to come up with a vessel design that would showcase its marine technology. The result is the E-Max and the smaller Bangkok-Max container feeder vessels that are 20% cleaner say the Danish designers.

**A**s vessel designs go the ABB/Knud E. Hansen feeder vessel which has a capacity of around 2000TEU, depending on the configuration, can be considered innovative in that the design allows owners the flexibility to choose the optimum design for their vessel for the trade that it will operate in.

The design also utilises ABB's DC Grid electrical distribution technology and its Azipod electrically driven propeller, along with a more conventional contra-rotating propeller directly driven via a shaft to the main engine. The hybrid design concept is expected to offer owners flexible and cost-effective feeder ship operations.

Birger Myklebust, ABB's vice president of dry cargo and specialised vessels BU Marine Global, explains that ABB's view was that demand for feeder vessels would grow due to the significant number of large container ship newbuildings on order. This persuaded ABB to employ Danish designer Knud E. Hansen whom they gave a specific brief for the vessel design; it would need to have improved energy efficiency, a minimum ballast water requirement, a hybrid propulsion solution and it must accommodate new technologies in power storage. The new design would be efficient, clean and, above all, flexible in its operations.

Continuing the theme David Tozer, container shipping expert at classification society Lloyd's Register, says flexibility in this market is everything. Changes to the way ships are now designed, ensuring efficiency over a range of speeds rather than at a single design speed, as in the past, means the design must prove itself over that range and the flexibility of the system is crucial.

In addition Tozer says: "the new generation of [conventional] engines are so efficient that they produce much less waste heat. Design solutions which utilise waste heat must be carefully considered to ensure that they are efficient, and operable, throughout the operational envelope of speed and power.

Power management is more complex than in the past."

Casper Ulback-Nilsson of Maersk Broker, who is charged with the marketing of the new design, agrees with Lloyd's Register's assessment that owners in today's market must have a flexible option. "There is a lot of interest in the ABB/Knud E. Hansen ships, primarily from German owners and some state-owned yards in China and a privately owned yard has also taken an interest," says Nilsson. He added that in today's market, which he says is a buyers' market, yards and designers need to provide "attractive and appealing" designs for owners.

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Economics are one attraction that cannot be ignored and ABB is currently making the calculations that will establish what the payback period would be for an owner buying the feeder ship with the extra capital costs put at US\$3-5 million for the electrical power units and the electric propulsion systems. "But if bunker savings of 12% can be achieved then owners will be interested," said Nilsson.

The major fuel saving advantages of the ABB-powered feeder vessel is that it can sail equally efficiently at 2knots or at 20knots. "If you need to cruise at 8knots to meet your terminal slot you can do it, others must sail at 14knots and then wait outside the port," explains Nilsson.

To achieve this flexibility on speed Knud E. Hansen have designed the vessel with a 16.3MW main engine and three auxiliary engines, one of 1200kW power output, one of 2800kW and a third of 4300kW.

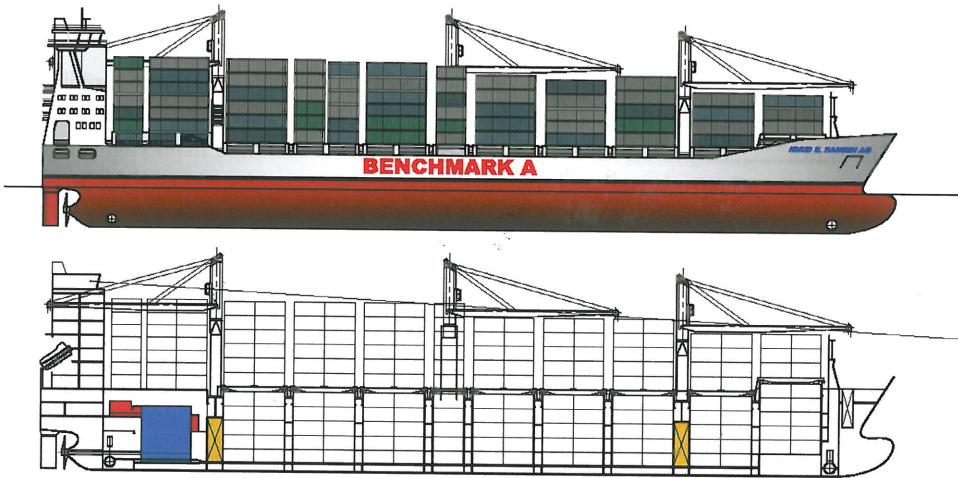
All the hotel and other electrically operated systems, such as reefer containers, will be powered by electricity produced onboard and distributed through ABB's DC Grid. Using the grid, electricity can be directed to where the demand is needed and as the power plants are of varying size electrical production can be tailored to the needs of the vessel at the time.

Essentially, the vessel can produce enough power to operate at 21knots with all propulsion systems in operation and still meet the other electrical power needs of the vessel, or it can operate at as little as 2knots depending on the needs of the time. At periods of varying power demand the vessel can run on one, two, three or four units offering significant fuel savings. It can operate all power plants at their optimum rate and vary the electrical power used to maintain the desired speed.

According to Jesper Kanstrup, senior naval architect at Knud E. Hansen, the positioning of the accommodation block just forward of central means that the vessel would need a minimum of ballast water and this design reduces the necessity for trimming the vessel. "In principle the ship can sail without ballast water, which means the loading flexibility is great."

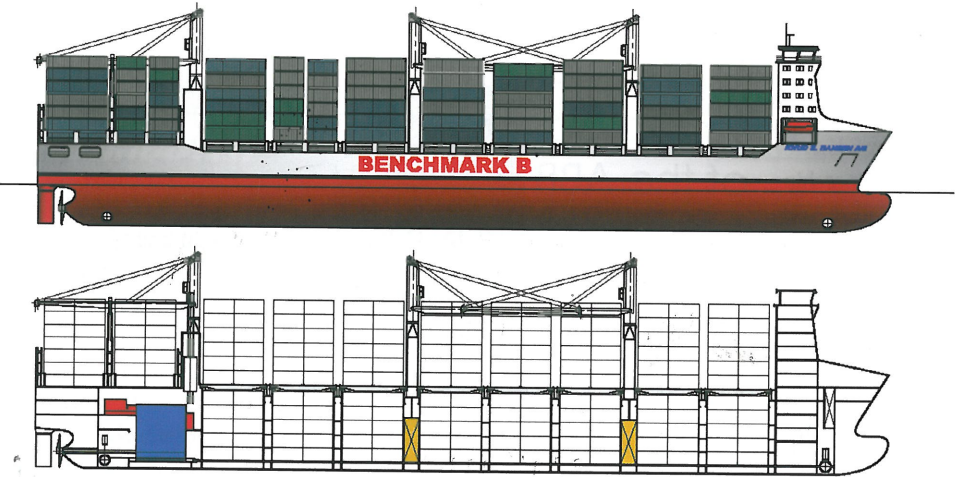
The position of the accommodation block in the centre of the ship does reduce the cargo capacity slightly compared to moving the accommodation block forward, but it offers greater capacity than having the accommodation situated in the standard position aft. (See illustrations on pp34). However, Knud E. Hansen believe that the central position for the accommodation is a workable compromise that reduces discomfort for crew and maximises the cargo capacity as well as improving visibility.

Knud E. Hansen decided that moving the accommodation block just forward of the centre was a good compromise, improving capacity and visibility over the rear-mounted accommodation and giving the crew a more comfortable ride compared to a ship with the accommodation block situated in the bow.



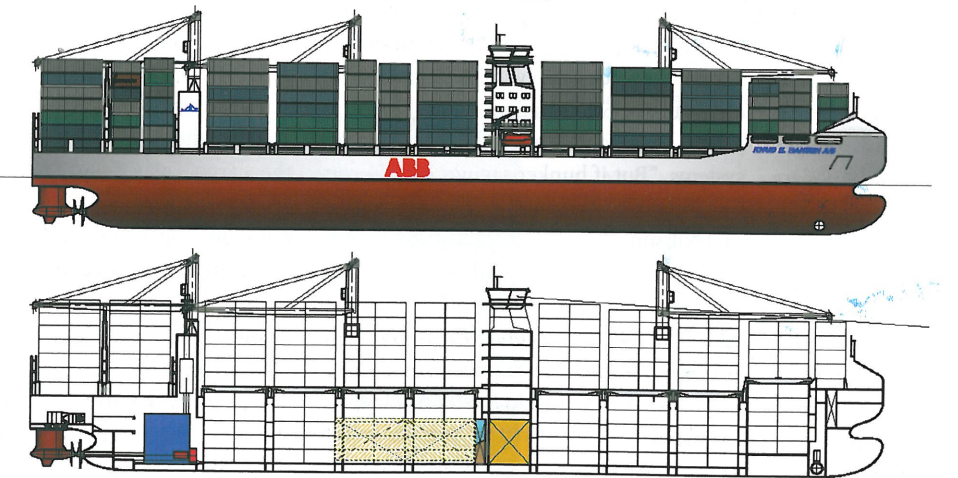
Gearless version	
TEU on deck	1260
TEU in holds	726
TOTAL TEU	1986

Geared version	
TEU on deck	1245
TEU in holds	726
TOTAL TEU	1971



Gearless version	
TEU on deck	1480
TEU in holds	708
TOTAL TEU	2188

Geared version	
TEU on deck	1460
TEU in holds	708
TOTAL TEU	2168



Gearless version	
TEU on deck	1448
TEU in holds	668
TOTAL TEU	2116

Geared version	
TEU on deck	1382
TEU in holds	668
TOTAL TEU	2050



Cell guides on the vessel are designed to handle hi-cube containers with ultra-wide boxes carried on deck, says Knud E. Hansen. The cargo storage system is again designed to offer the maximum flexibility to the owner.

Payback time for the Bangkok-Max is likely to be longer than for the E-Max which is 14m longer, with an extra cargo hold behind the accommodation block, than the 172m long Bangkok-Max, which also has an 8.2m draught. And the various configurations available, that is geared, gearless etc will mean that the return on investment for owners could vary. For example, the geared Bangkok-Max will have a capacity of around 2050TEU

while the gearless version would be able to accommodate 2116TEU. However, the E-Max versions will be able to carry 2300TEU and up to 2360TEU.

The two contra-rotating propellers allowed the design to utilise smaller screws which in turn allows the ship to use a minimum of ballast water for trimming purposes, and the Azipod system allied with tunnel thrusters will give the E-Max vessels sufficient manoeuvrability to be able to enter port and dock without the aid of tugs.

This type of vessel needs an owner with vision for it to gain acceptance, claims Nilsson: "It needs an owner like Maersk to back it up with a charter, because the

design is a little more complicated than other ship designs," he adds.

Kanstrup confirms that owners were sceptical about the extra cost of the Azipod and DC Grid. "Owners think in a conventional way. They consider the design, investment cost and reliability and so they are interested in more traditional propulsion plant," he says.

Knud E. Hansen do offer an alternative to the ABB propulsion system, the vessel can be fitted with a derated MAN 8S 60ME or a Wärtsilä RT Flex 58 engine with seven or eight cylinders. In addition owners can request that the ship is designed with LNG power with LNG fuel tanks beneath the accommodation block. **NA**