



Twentyfour7.

Wärtsilä Stakeholder Magazine

→ 03.2009

A COMMON-SENSE APPROACH TO IN-PORT CONTAINER LOGISTICS

► TEXT: RICK MCARTHUR | PHOTO PROVIDED BY: WÄRTSILÄ

AN INNOVATIVE DESIGN for a self-propelled and self-sustained container barge from Wärtsilä Ship Design is not only an environmentally sound option for sea ports, it can also bring substantial benefits to container logistics in major container ports.

Despite the present downturn in worldwide container shipping, containerisation is a victim of its own success in terms of congested sea ports, many of which also suffer from a shortage of hinterland facilities. The Port Feeder Barge (PFB), a unique concept, offers port operators a way of reducing congestion caused by trucks moving containers within ports.

Even in Hamburg, known as a 'rail port' because of the relatively high share of container on-carriage by train, almost 50% of on-carriage is still performed by truck, and roads within the port are badly congested. Estimates indicate that each year, some 250,000 boxes – many of them empty – are trucked between facilities located within the port.

A completely new type of vessel

To help reduce the number of containers on port roads, PORT FEEDER BARGE GmbH

commissioned both the basic and detailed design work for the PFB – a completely new type of vessel – from Wärtsilä Ship Design.

As conventional barge services require quayside cranes for loading and unloading, a single waterborne container movement within a port results in two additional crane handlings. "Because the only cranes available at terminals are the big gantry cranes designed to serve even super post panamax container vessels, this is a very expensive option," says **Christian Marburg**, Director Engineering, Wärtsilä Ship Design in Germany. "Crane-related costs alone will usually total about twice as much as an entire trucking operation within the port."

The PFB's patented double-ended design is a self-propelled container pontoon with a capacity of 168 TEU. Highly manoeuvrable, it carries its own state-of-the-art full-scale container crane together with all the accessories required to

The PFB's patented double-ended design is a self-propelled container pontoon with a capacity of 168 TEU.



pick up the increasing number of container flats with out-of-gauge cargo. The crane has a capacity of 40 tonnes under the spreader at an outreach of 27 metres.

Equipped with two electrically-driven rudder propellers at each end, the PFB can sail at the same speed either forwards or backwards. Power comes from a diesel-electric engine plant fitted with exhaust scrubbers for the lowest possible emissions and the vessel can be operated by a crew of three. It fulfils the highest environmental standards.

Built for heavy-duty use

The key element in the PFB concept is the full-scale container crane. "All its mechanical components are capable of continuous operation," says Marburg. "Most shipboard cranes are designed for operation only every few weeks when the vessel is in port. As the PFB is in port seven days a week, the performance requirements are even higher than those for most quayside cranes."

When berthed, and without being shifted along the quay, PFBs can load or discharge 84 TEU in three layers to and from the space between the rails of typical quayside gantry cranes. The high column on which the crane is mounted gives the crane driver a good view over the quay and enables containers to be stacked in five layers, which means the PFB can serve the highest quays, even at low tide in open-tide ports.

Reducing terminal costs

PFBs offer waterborne transport within a port, including craneage, at competitive rates compared to trucking. No additional work by terminal facilities is required. Instead of serving trucks the straddle carriers simply transport containers to any quayside zone where the terminal wants the PFB to berth. "Terminals that grant PFBs a

THE PFB CAN SERVE THE HIGHEST QUAYS, EVEN AT LOW TIDE IN OPEN-TIDE PORTS.

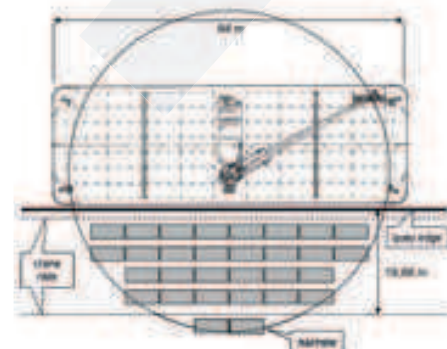
permanent berth can even reduce their costs," says Dr. **Ulrich Malchow**, Managing Director of PORT FEEDER BARGE GmbH. "Delivering boxes directly to a PFB berth avoids the need for intermediate container stacking."

Somewhat surprisingly, road hauliers are strong supporters of the concept. Congestion on the roads and at the terminal gates means they often lose money trucking boxes inside a port. "Only when a PFB is in service will there be someone who is eager to relieve truckers of these unprofitable trucking tasks," says Dr. Malchow. "Our understanding is that 80% of trucking within ports is not time-critical, and for jobs consisting of 20-30 boxes, using a PFB will actually be faster than trucking."

Improving safety and raising efficiency

While the primary argument for using PFBs depends on their being commercially competitive with trucking, they also have plenty to offer both feeder and inland navigation operations. "In the port of Hamburg, for example, up to 60 feeder vessel movements take place each day, mostly shifting from one berth to another" says Dr. Malchow. "Having PFBs collect and distribute containers destined for these feeder vessels would allow them to concentrate on the major terminals, reducing the number of vessel movements, the time they spend in port (and related costs), while at the same time improving safety and increasing terminal efficiency."

Vessels involved in inland navigation are usually assigned the lowest priority at terminals. As a result, they spend a lot of time hopping from one terminal to another. "Inland waterway vessels need to call only once at a dedicated berth to meet a PFB," says Dr. Malchow. "Containers can be exchanged ship-to-ship at the dolphins without requiring any terminal equipment or



The crane on the PFB can lift 40 tonnes and has an outreach of 27 metres.

a quay. By delegating inland waterway vessels to PFBs, terminals can increase their efficiency and at the same time substantially improve the intermodal connections for inland navigation in seaports."

Floating container trucks

In ports such as Hong Kong, the world's third-busiest container port, one third of container throughput is already handled midstream using fairly simple equipment, and the barges employed are not even self-propelled. Self-sustained midstream barges serve several small container wharfs close to urban areas, providing an alternative to Hong Kong's expensive terminal fees. "Since its hull is already designed for restricted coastal service, a PFB can significantly improve the efficiency of such midstream operations," says Marburg.

Other ways in which a PFB can assist port operations include acting as a floating container truck serving separate container freight stations in the neighbourhood. These facilities remove the stuffing, stripping and container storage activities to off-dock facilities which often have their own shallow-water access but no cranes, resulting in additional road haulage operations.

An extra resource for various situations

Many minor ports are cut off from containerisation as their water depth and/or quayside facilities are not adequate for even mid-sized container vessels. Deep-sea container vessels can easily be served at anchor by PFBs as they can independently shuttle boxes between ship and shore.

Last and by no means least, PFBs can be employed as standby vessels in emergency situations such as grounded container vessels. "This is a situation that even major container ports are not fully prepared for," says Marburg. "With their very shallow draught and by working from both sides, a PFB can even lighter grounded container vessels which have a larger than panamax beam." ●