Grup TCB, through its subsidiary TCEEGE in Turkey, commenced operation of the container terminal situated in Nemrut Bay, close to Izmir, in 2009. In Turkey, jetty piers 25 to 40 metres wide are standard, allowing vessels to be berthed on both sides. This explains why jetties are operated mainly by means of mobile harbour cranes (MHC), and this is how TCEEGE began to offer its services to the shipping lines.

A MHC is aflexible machine, which can achieve good productivity in small feeder vessels, up to 20 moves per hour, and can shift easily from one side of the pier to the other. However, the MHC has to face many disadvantages compared with ship-to-shore gantry cranes (STS) as regards to productivity, as STS cranes aim for 30 moves per hour.

**Placement considerations**

When you handle containers on a jetty pier, traffic jams are an issue to be considered, as you have a bi-directional flow of terminal tractor (TT); and hatch covers must be placed properly to minimise disturbance. Also, considering the space needed by a MHC, it is easy to see that there is a limit of placing up to four MHC on a jetty; otherwise congestion might occur.

Thus, due to the cascade effect of the container vessels in the Aegean area, and concern with offering higher productivity to its clients, Grup TCB raises the following question: how best to place STS cranes on a jetty?

The first idea consisted of placing STS cranes on both sides of the jetty, which meant removing the back reach of these cranes, as they will need to pass each other in a back-to-back configuration. As every deployment has to be done in phases, Grup TCB’s first thought was to place two STS cranes with no back reach on one side of the jetty, and operate on the other side with its current Liebherr MHC LHM 500.

In a second phase, it was planned to widen the jetty from 40 to 57 metres to fit two additional STS cranes on the other side.

Thus, in its final phase of deployment,
TCEEGE would have up to four STS cranes, two on each side of the jetty. On the previous drawing, it can be seen that the hatch cover (limited to 12 metres) would be placed on a platform situated above the portal beam of the crane, producing a fluid traffic flow.

However, a new drawback arose, related to capital expenditure. Widening a jetty along 350 metres requires a considerable amount of money, without forgetting that even if the terminal is willing to widen the jetty, its handling activity would be close to saturation. Then it starts to be a concern to have one side of the jetty not available while the construction is going on.

Moreover, coming back to the cascade effect of the container vessels, shipping lines are not only expecting good crane productivity, but also adequate crane intensity, which combining both factors means good vessel productivity: this is what customers need. Obviously, only two STS cranes on one side might not be sufficient, thus obliging the terminal to make an additional investment. Consequently, Grup TCB dropped this concept, and focused its research on trying to find solutions to increase vessel productivity with lower investment.

A new idea
A few months later, a new idea was raised: the ‘double boom’ STS crane. At first sight, it seems that the main disadvantages of MHC and STS without back reach were solved. There would be no need to widen the jetty. Less investment in equipment was required — in the final stage, four cranes will be positioned on the 350-metre jetty, thus allowing up to four cranes at the same time on one vessel. The average vessel productivity would then exceed 100 moves per hour. Both sides of the jetty could be used at the same time. Fluid traffic flow of TT would be achieved, as the crane is designed with a 36-metre span for a 40-metre wide jetty. More space would be available to fit the hatch cover above the portal beam of the crane, up to three elements 16 metres wide. So there is no traffic build-up on the jetty.

Grup TCB organised some internal meetings with its operation specialists from its network of terminals, in order to analyse the result of different scenarios and simulations carried out by the technical department of the company. Additionally, Grup TCB requested an outside opinion from a Canadian consultant, and all...
conclusions pointed in the same direction: this was just the crane TCEEGE needed.

Making the idea a reality
Meanwhile, different meetings were held with the major crane manufacturers. Very quickly, Liebherr was appointed by Grup TCB to develop this new machine, as they had the right profile to develop a prototype of this magnitude, and were able to offer aftersales service, as some fine-tuning would be expected. During the design phase, Liebherr brought all its knowledge to bear to solve various technical challenges; such as ensuring that the crane was able to work with either boom, the other one being in the raised or lowered position, which means the main hoist is placed on the trolley and a double festoon ensures the electrical supply. Turning the cabin was possible to ensure the crane driver always faces the vessel, whichever boom it is travelling on. A displaceable platform above the portal beam was needed to accommodate up to three hatch covers. This platform was placed on the opposite side of the crane to allow the shortest handling cycle of the container.

Regarding TT traffic, the flow is quite different from the traditional one below a standard STS. As mentioned above, TT traffic enters and exits the jetty through the same access point, so a two-way traffic road has to be painted in the centre of the jetty. We call it a two-way ‘pit lane’. Below the crane, close to the berth and on both sides, two lanes are marked and are used as ‘pit stop’ positions. Figure 4 attempt to explain the details of this flow, and using the words ‘pit lane’ and ‘pit-stop’, the drivers’ union has quickly assimilated the concept.

Working like this, there is still plenty of space under the crane, more precisely below the hatch cover platform, which allows the placing of twist lock boxes, a small forklift or other light vehicle. Currently TCEEGE is operating two double-boom cranes, and in the near future, as the container traffic volume at the terminal increases, additional double-boom cranes will complete the fleet.

Has Grup TCB found the right crane to operate a modern container vessel on a jetty pier? Time will tell, but so far TCEEGE is well known in the east Mediterranean, thanks to this concept coming into fruition. Now other terminals in Turkey are requesting quotations for the same crane from different manufacturers. Is TCEEGE showing the way?

Figure 4. The traffic flow for the new concept.

About the author
Paul Duponcheele has a mechanical and industrial engineering diploma from the French school ICAM (Institut Catholique des Arts et Métiers), and spent 18 years plying his trade as an equipment and procurement director at an international construction company, where he was central to their engineering projects involving dams, tunnelling, road and maritime infrastructure. He became technical director of Grup TCB in 2009 and heads up the design and construction, equipment and IT departments.

About the organisation
Grup Maritim TCB is a global reference in the design and efficient management of port terminals. It currently operates 11 maritime container terminals in Barcelona, the Canary Islands, Valencia and Gijón (Spain), Paranaguá (Brazil), Havana (Cuba), Progreso (Mexico), Buenaventura (Colombia), Nemrut Bay (Turkey), and will soon add Puerto Quetzal (Guatemala) to this list. The company also boasts two intermodal service subsidiaries (TCB Railway Transport and TCV Railway Transport), as well as five rail terminals — Barcelona, Valencia, Gijón, Zaragoza and Valladolid.

Grup TCB places special emphasis on optimising its internal resources and on the organic development of its activities, which it achieves thanks to the implementation of cutting-edge technologies and the qualified training of its personnel, guaranteeing operational quality and maximum sustainability and respect for the environment.

In 2013 the company achieved revenues of €400 million, while its activities in port terminals exceeded 3.7 million TEU of containerised cargo, in addition to 136,000 TEU carried by rail.

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