

With an operating weight of 1200 tonnes, the Blockbuster handler dominates the skyline at the new Rotterdam port project.



BLOCK booking

A massive 1200-tonne mobile crane dominates the skyline at a major port expansion project in Rotterdam. Steven Vale takes a sneak preview of the metal monster before it starts work building a new hard sea defence.

Each year, more than 34,000 seagoing ships and another 133,000 smaller vessels visit Rotterdam, Europe's largest container port. If laid end to end, the 10 million containers handled each year would circumnavigate the globe. Shipping volumes are forecast to increase sharply during the next few years; 17m containers are predicted for 2014, rising to 38m by 2035. The massive port complex at Rotterdam is already fully stretched, giving rise to an expansion programme to meet the anticipated growth in business.

A €3 billion investment by the Port of Rotterdam Authority called Maasvlakte 2 will eventually provide an additional 1000 hectares of area and boost container handling capacity by 20%. The project – called PUMA (Project Organisation for the Expansion of the Maasvlakte) – has been awarded to a consortium headed by dredging and marine contractors Boskalis and Van Oord.

The first stage of the expansion project will be finished by 2013 and will require shifting some 240 million cubic metres of sand. For the past 18 months a huge fleet of dredgers have been busy 12km out at sea and have so far supplied the project with a staggering 160m cubes. At the peak of this part of the operation, 11 hopper dredgers pumped ashore 3.8m.cu.m in a single week – thought to be a world record for a single job site!

The most challenging aspect of the project is constructing 11km of sea defences and in particular the 3.5km stretch of hard defences within this

Main Picture and Inset Picture: The pair of Hitachi EX1200 excavators on rock-shifting duties both need three main boom lift rams for the 25m long-reach equipment.

structure, which will consume five million tonnes of rock over the next two years. Works manager Anton van Dongen reveals that rock is currently arriving at the rate of 100,000 to 130,000 tonnes a week from quarries in Norway, Scotland, Belgium and Germany, and they already have over 1.5m tonnes stockpiled on site.

However, plenty of material is available for recycling on site, including 20,000 2.5m-square concrete blocks and an estimated two million tonnes of stone from the old sea defences. The *Nordic Giant* pontoon equipped with a huge Liebherr P995 excavator with a ripper/claw attachment recovered the first 1000 blocks last spring. The identical pontoon called *Wodan* is currently on site.

Painstakingly extracting just five to eight blocks an hour, it is a difficult task because the 40-tonne blocks were simply tipped into the water when the original sea defences were built. As a result they all lie at different angles and the operator of the big backhoe dredger depends upon a sonar image from an acoustic camera to accurately pinpoint the position of the blocks as they lie on the seabed.

After the blocks have been recovered they are loaded on to pontoons and taken back to dry land, where they are lifted off by a 300-tonne Liebherr L1300 crane. Dutch-made HoverTrack truck tractor units pull block carriers to transport these salvaged items around the site. The 40-tonne blocks are secured within this attachment by a hydraulic side-shift mechanism. This operates at a maximum pressure of 170bar, the blocks being held in place as the frame rises clear of the ground by wear tips from a Wirtgen road planer.

The preparation work for the new hard sea defence keeps 45 machines fully occupied, some of which have been developed specially for the project. For example, a pair of Hitachi EX1200



The 40-tonne concrete blocks from the old sea defences are currently being recovered by a Liebherr P995 excavator with a ripper/grab attachment.

excavators feature triple main boom lift cylinders coupled to 25m-long front-end equipment and shod on a reworked undercarriage that leaves a 7m x 7m footprint.

Then there is a one-of-a-kind Caterpillar 385 excavator with a double cab and a reach of 45m. Called *Condor*, it is fitted with a sonic device for surveying close to the shore where it is too shallow for vessels and too dangerous for people.

EQUILIBRIUM CRANE

Hitachi on steroids and fat Cats are all very well and good, but pale into insignificance when compared with the Blockbuster. This 1200-tonne monster is described as an equilibrium crane and cost the best part of €5m from E-Crane, the creation of Belgian company Indusign. The top half of the Blockbuster was sourced from a Texan port and modified by E-Crane to lift 40-tonne blocks.



The long-reach equipment on this Cat 385B is impressive enough from a distance, then you notice the extra cab to accommodate the surveyor.



Once recovered from the seabed, the 2.5m-square blocks are craned from the pontoons to dry land using a 300-tonne Liebherr crawler crane.



Hydraulically operated carrying frames are towed behind HoverTrack tractor units and are used to shift the 40-tonne blocks around the site.



Client PUMA came up with the idea for a one-of-a-kind undercarriage that used three track groups from the original port handler crane. This not only provides an on-board canteen area, but also a workshop and a separate office for the surveyor. Its sizeable deck area is also used to store all four attachments available for the crane and undercarriage ballast.

Taking six months to assemble, the huge handler dominates the Rotterdam skyline. Fitted with a specially-developed cradle, it is capable of picking and placing 40-tonne blocks at 50 metres. Even more impressive is that, when it starts work in earnest, it will be able to place blocks under water, even at night, with an accuracy of 15cm! This is only possible using a newly-created computer system, the details of which are being kept under wraps for the time being.

Despite the Blockbuster's massive dimensions and capacity, power comes from a relatively small 900hp Caterpillar engine. There is little danger of it running out of fuel because the massive undercarriage contains a 20,000-litre diesel tank. The low energy requirement is one of the big features of the E-Crane because the weight of the load is counter-balanced by a moving weight at the rear of the crane. Connected by a mechanical link, the central section of this rear ballast alone weighs 75 tonnes, while the two sides each contain 18cu.m of concrete.

With more than 15 years' experience with E-Cranes, operator Klaas Smits reckons this latest creation is phenomenal: "It is fantastic," he says, "and there is so much power."

It is quite a climb to the cab, the last stage of which is through two steep stairways up the middle of the pylon supporting the crane. The cab is

amazingly quiet, as the engine is so far away. Offering 8m of vertical movement, at its maximum setting the operator is 18m above the ground and enjoys fantastic visibility. This is aided by a pair of CCTV screens, carrying pictures from no fewer than eight on-board cameras.



There are always two operators on board the E-Crane, who swap roles every one or two hours. Even working round the clock with two 12-hour shifts, it is going to take the best part of two years to position all 20,000 blocks. Before this phase of the work can start, the team working with the

Main Picture and Above: Starting from an existing E-Crane that used to work in a Texan port, the Blockbuster was modified to enable 40-tonne blocks to be placed at 50 metres.

300-tonne Liebherr crane has to finish the access route. This is a 3.5km road of cobbles over 150kg to 800kg blocks and protected by rock armour weighing up to 10 tonnes imported from Norway. When this is finished it will probably take the Blockbuster the best part of two days to travel to the end of the road. Working backwards towards the land, PUMA plans to position the blocks at the rate of 10 an hour.



This Picture and Below: Three pairs of track units are needed to support the weight of the 1200-tonne structure, which includes undercarriage ballast weighing around 400 tonnes.



Right: Surrounded by an array of control screens, some of which remain a commercial secret, operator Klaas Smits is delighted by the Blockbuster's sheer power.

Maasvlakte 2: Visitors welcome

The massive project to place millions of tonnes of sand is attracting a lot of attention. The Port of Rotterdam has built a visitor centre right on the edge of the project called FutureLand. As well as affording good views over part of the newly reclaimed land area, it provides visitors with a restaurant with an outdoor terrace area and a non-stop view of the work, in addition to daily guided tours around the edge of the land-building activities. Taking an hour, and costing €5, they are hugely popular and sold out weeks in advance.

