





HITACHI'S MARINES

Middle East Crane Equipment Trading modifies Hitachi's hydraulic crawler excavators with extended booms and raised platforms to equip them for dredging and breakwater construction



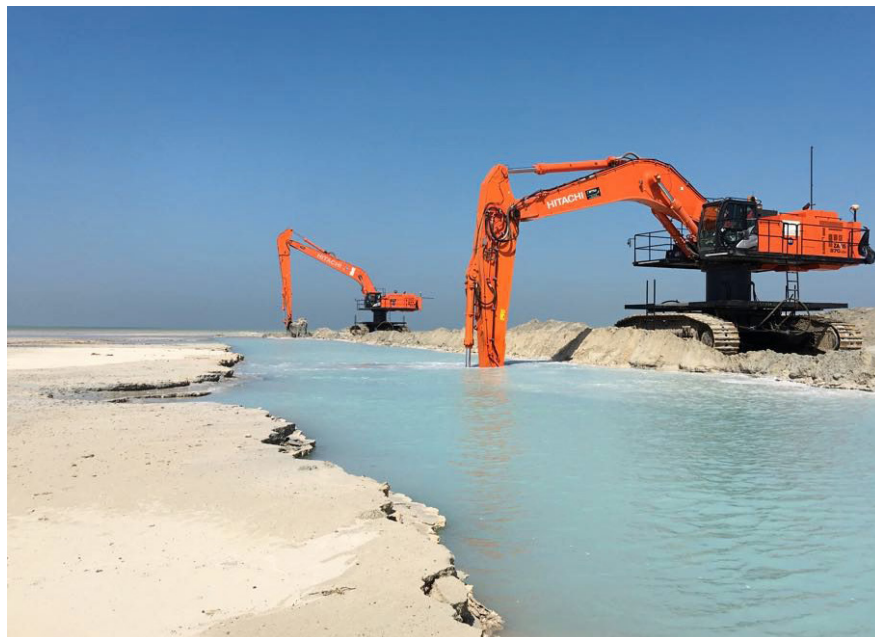


An excavator working on land is designed to be versatile for several applications such as building and road construction, demolition, utilities installation, and waste and recycling activities with change of attachments. The same excavator, if required to work at a dredging or breakwater construction site, needs to be modified by a specialist company that can customise the excavator for safety, performance and stability for a marine environment.

With the right modifications, excavators can be driven directly from land to sea for marine works up to certain depths without the need for mounting them on pontoons or barges. This helps reduce manpower costs as only one operator is required to transport the machine from land to sea, unlike pontoon or barge installations which require a group of technicians and additional equipment.

In this region, such modification jobs for Hitachi crawler excavators are handled by Middle East Crane Equipment Trading (MECET), a member of Belgium-based Luyckx Group and the official distributor of Hitachi Construction Machinery in the UAE and HSC Cranes in the Middle East.

MECET specialises in two types of modifications for Hitachi crawler excavators in marine applications: (1) installation of extended booms and sticks or super long fronts; and (2) installation of pedestal mounts between the upper- and undercarriages to



increase the height of the excavator. These modifications enable the excavator to operate with stability above the water level and the bucket or other attachments to reach the required depths underwater.

Wim Aernouts, director, Middle East Crane Equipment Trading, explains: "We specialise in modifying medium-size and large Hitachi crawler excavator models with heavy-duty long booms and raised carriages. If a customer wants to deploy a Hitachi excavator

for marine applications, they contact us to modify the machine. MECET then finalises the design of the excavator modification and places an order for the specified boom and stick kits from the Luyckx factory in Belgium. The kits are then assembled on the excavator at the MECET factory in Dubai."

The long booms and sticks are supplied as separate kits so that they can be swapped with the original kits after completion of the marine project and the excavator can be



■ Assembly of excavator booms at the MECET factory in Dubai.

deployed back on a job site on land.

"The lead time for fabrication of the boom and stick kits in Belgium and delivery to Dubai ranges from two to three months. The time required for installation of boom extensions in Dubai is around one week and that for increasing the excavator height is two weeks," says Aernouts.

Design of the super long front involves pushing the limits of boom length and bucket

capacity. The bucket capacity varies with the boom length: the shorter the boom length, the higher is the bucket capacity. The standard bucket capacity of these excavators with a single boom is around 2.4m³. As the boom length is extended, it supports smaller bucket sizes. For example, the bucket capacity of the EX1200-7 with standard boom length of 12m is 6m³; when the boom lengths of this excavator are increased to 21m and 29m, the

bucket capacities reduce to 4m³ and 2.4m³, respectively.

"We have the engineering expertise to design larger bucket capacities than those available on the factory-built versions of the excavators. We can build super long fronts with work distances of up to 36m and adapt excavators and dipper dredgers of 200 tons and heavier for offshore works. The longest boom we've constructed is 42m with a bucket



Roland Schmied, service manager, MECET; Wim Aernouts, director, MECET; and Piet Bakergem, general manager, HMEC.

capacity of 4.5m³ on the EX1900-6, resulting in a 250-ton machine. To increase lift capacity further, we also install three-piece booms for improved articulation of the excavator boom when the material needs to be close to the machine,” says Aernouts.

While designing raised excavators, MECET mounts the upper carriage of the excavator on a pedestal installed on the undercarriage. Hitachi’s factory-built excavators have a height of 1m as standard. This can be increased to a height up to 7m with a pedestal mount.

MECET offers two types modifications to increase the heights of excavators: (1) the upper carriage including the boom and stick are raised above the pedestal mount, and (2) the cabin, engine and hydraulic components are raised, but the boom and stick remain in their original positions; this is required when the boom is required to go as deep as possible under the water and would have a lower reach if raised.

The hydraulic and electronics systems of the excavator are modified to enable control of the larger machine, and counterweights are installed for additional stability.

“We have a long history when it comes to the development and production of Hitachi excavators equipped for working up to a water depth of about 5m. Currently, we modify the heights of two Hitachi models – the ZX870LC-5G and EX1200-7 – for the Middle East. We’ve also increased the height of the ZX870LC-5G to 10m for an international project,” says Aernouts.

MECET also offers an adjustable option

where the base unit can be raised and lowered by means of a scissor lift mechanism installed on the undercarriage. Although this mechanism makes it easy to transport the excavator and enables the operator to adjust the height of the upper carriage, the modification is significantly more expensive and less stable than a pedestal mount. Nevertheless, MECET equips pedestal-mounted excavators with several safety mechanisms.

“Operator safety and machine stability are critical in a marine environment. Operators face the risk of excavators sinking due to unstable ground. In such situations, the operator will not be able to manoeuvre the machine to a safe position. To improve stability as well as prevent sinking, we modify the undercarriage by moving the track outwards and installing a platform between the tracks to create a square-shaped base that seals the space between the tracks; for example a 4x3m based is converted to a 4x4m base. This provides increased stability if the machine starts to sink by enabling the machine to support its weight on the square platform,” explains Aernouts.

MECET also provides a backup generator for emergencies such as engine and pump breakdowns. The backup generator installed beside the upper carriage can help the operator manoeuvre the machine to a safe position or place the boom on the ground while waiting for evacuation. Raised excavators also have additional platforms or walking floors around the upper carriage as well as above the undercarriage for

the operator to walk around the machine and inspect both the upper carriage and undercarriage.

“We also provide solutions for excavators working under extreme conditions. If the excavator works with a hydraulic breaker or hammer attachment underwater, we install a compressor that supplies steady air pressure to prevent water from damaging the breaker. For subsea excavation, we can modify excavators to be controlled remotely. We’ve supplied a modified ZX470 model for the foundation work of a windmill installation project in Sweden and Norway. The cab was removed and the excavator was lowered to the bottom of the sea with a crane and operated at temperatures below -20°C via remote control and cables,” says Aernouts.

MECET provides the same warranty on modified excavators as that of Hitachi’s factory-built machines, along with aftersales support for maintenance and repair and operator training.

Piet Bakergem, general manager, Hitachi Construction Machinery Middle East Corporation (HMEC), says: “Hitachi excavators are prominent in special marine applications in the Middle East and elsewhere because of the engineering expertise of our dealers such as MECET, which has decades of experience working with the world’s top dredging companies in Europe that also operate in the Middle East. We expect sustained growth in this market with our leadership position and continued investment in technology to help improve productivity on marine construction sites.” **PMV**