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SEALING THE DEAL

Water tightness is key to the island and tunnel project of the Hong Kong-Zhuhai-Macau Bridge. Trelleborg will ensure that 33 tunnel sections remain safe at deep-sea depths of up to 40 metres.

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ince the official start of the island and tunnel project of the Hong Kong-Zhuhai-Macau bridge (HZMB) joint venture of China

Communications Construction Co Ltd (CCCC) in 2009, work has not stopped for engineers and other staff, such as Lin Ming, General Project Manager and Chief Engineer.

Zhuhai, in Guangdong province, China, stands on the west bank of Pearl River Delta (PRD), which feeds into the South China Sea. It borders Macau and faces Hong Kong on the other side of the delta.

Lin has worked for more than 30 years on a variety of construction projects for CCCC. Nevertheless, the difficulties and risks involved in this project are unprecedented for Lin and his colleagues.

As a combination of bridge, tunnel and artificial island, the 49.9 kilometer HZMB is a mega-link between Hong Kong, Zhuhai and Macau. The island and tunnel project, overseen by the CCCC joint venture, is a critical part of the overall construction work, and involves some of the most difficult to construct immersed tunnel in the world – and two artificial islands.

THE PROJECT HAS been divided into four phases. The two artificial islands were built during the first phase. The second phase involved the construction and installation of the first tunnel section, which was completed in May 2013. The third phase involves installing the remaining 32 tunnel sections. This will be the most difficult and time-consuming phase, and will take around three years. The fourth phase will involve engineering work inside the tunnel, as well as some construction work on the artificial islands.

“The duration of the contract for the island and tunnel project is six years. At present, we’ve finished installing the first two tunnel sections, using half of

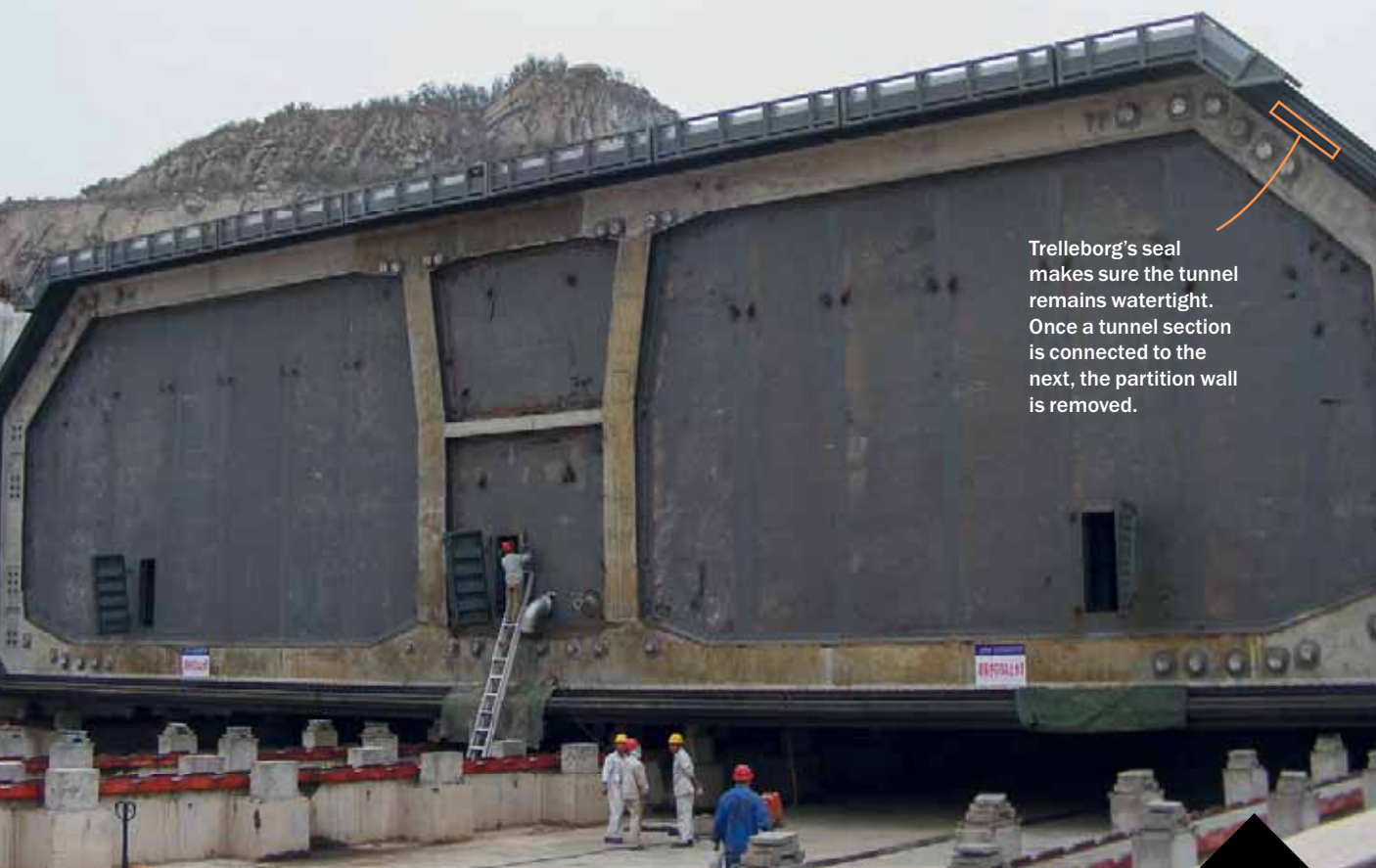


“We spent two years studying complex marine issues, preparing for the installation”
Lin Ming, China Communications Construction Co Ltd

the duration of the contract. The first two are 112.5 meters in length and weigh 50,000 tonnes respectively while, from the third one on, the tunnels are 180-meter-long and weigh 80,000 tonnes,” says Lin.

“Relatively speaking, the installation of the first two tunnel sections has inaugurated the overall project. Given that we were working on the open sea and the high risk involved, we spent two years studying complex marine issues, preparing for the installation,” Lin says. “We’ve done a great job in terms of the installation of the first two, and until now, everything has gone as planned.”

THE EXPECTED SERVICE life of the HZMB is 120 years, and it’s designed to withstand a magnitude-8 earthquake. As a result, the tunnel sections need to remain watertight for 120 years. Water tightness is integral to the immersed tunnel, and requires high-quality sealing products. Therefore, the Project Management Department organized an international bidding for the tender.



Trelleborg's seal makes sure the tunnel remains watertight. Once a tunnel section is connected to the next, the partition wall is removed.



Local production

The four types of sealing products used in the HZMB immersed tunnel were designed and manufactured by Trelleborg Offshore & Construction's infrastructure operation. Two of them were produced at the Trelleborg's facility in Qingdao, China. "We take pride in cooperating with CCCC on the HZMB island and tunnel project. Trelleborg can offer a total sealing system, with its design and production capabilities. At the Qingdao facility, we have been able to manufacture some sealing products that satisfy customers' requirements of product quality, transportation and cost," says Jackie Huang, Managing Director of the infrastructure operation of Trelleborg Offshore & Construction in Qingdao. The other seals were produced at Trelleborg's manufacturing facility in the Netherlands.

According to Lin, the competition was stiff, with several well-known suppliers of sealing solutions dropping out due to the highly specific technical standards required and a lack of appropriate experience. Trelleborg won the bid, becoming the sole supplier of sealing solutions for the immersed tunnel, with the Project Management Department taking a variety of factors into consideration, such as product performance, product design and corporate performance. The products ordered included Gina gaskets, Omega seals, waterstops and a variety of sealing accessories.

"Many suppliers don't really understand the project, and they can only deliver products," says Lin. "The island and tunnel project is sophisticated and risky. We can't allow imperfect sealing products to ruin the entire project. Trelleborg are very cooperative. They identify our needs, conduct experiments based on their own experience and expertise and then explain the principles involved for us. Their professionalism and creativeness are demonstrated by reliable communication as well as full support."

The order placed by the Project Management Department is Trelleborg's biggest ever in terms of tunnel infrastructure business. According to Lin, the project will expand Trelleborg's brand influence and strengthen its lead in the industry.

"As a business partner, we are very happy with our relationship with Trelleborg," Lin says. "We believe the sealing products will continue to satisfy our demands in the following installations as long as we're working with Trelleborg. It's an unparalleled feat for us to undertake an offshore engineering project of this scope relying on our own capabilities. Thankfully, we are working with Trelleborg, a reliable partner, to achieve mutual trust and benefits." ■

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INFORMATION
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