



Zhong Tie Bo Hai 1 Hao

Since the beginning of November, the first in a series of diesel-electric train ferries delivered from the Tianjin Xingang Shipyard in Tanggou has served a new route across the Bohai Strait between Yantai in east China and Dalian in the northeast

by Henrik Segercrantz

Zhong Tie Bo Hai 1 Hao (Sinorail Bohai No1), the first 22,700gt ropax freight-train ferry in a planned series of nine vessels, was officially delivered in mid-October from the Tianjin Xingang Shipyard in Tanggou, situated on Bohai Bay, China. Owned and operated by Yantai-based Sinorail Bohai Train



Ferry Co Ltd, the ships are designed to serve a new train ferry line across the Bohai Strait between Yantai and Dalian.

The newbuildings have been designed by Shanghai Merchant Ship & Research Institute, together with the shipyard. *Zhong Tie Bo Hai 1 Hao* is designed to carry freight train wagons, trucks, cars and passengers. It has an overall length of 182.6m, breadth of 24.8m and a draft of 5.8m.

Currently, more than 18 million tonnes of cargo and seven million people travel annually between Dalian and Yantai. The railway system links the northern end of the Shandong Peninsula and southern tip of the Liaoning Peninsula and its new six-hour 86.3 nautical mile-long ferry leg will shorten the original train connection between these two cities by some 1,500km, and from northern China to the southeastern areas by about 1,000km to 1,600km.

The new route was officially approved in 1997 and is an important part of China's coastal railway corridor intended to help rejuvenate the country's aging industrial area in the northeast. The ferries will also ship products up to the northeast including export products to Russia.

In the Bohai Strait project's first phase, three ferries are planned, and by 2008 all of these will be operating on the Bohai Strait crossing. Initially, the railway transportation capacity is estimated to be 6.5 million tonnes

– three million tonnes allocated to Dalian and three and a half million tonnes to Yantai.

The new ferry is owned by a joint venture between Sinorail (50 per cent), Dalian Construction & Investment Co (17.5 per cent), Yantai Power Investment Co (17.5 per cent) and Sinorail No 2 Bureau Ltd (15 per cent). In 2004, the cost of the total project was initially estimated

ZHONG TIE BO HAI 1 HAO	
Builder	Tianjin Xingang Shipyard
Owner/operator	Sinorail Bohai Train Ferry Co Ltd.
Hull No	SB346 1 (sistership SB346 2)
Length, oa	182.6 m
Length, bp	164.6 m
Breadth	24.8 m
Depth, mld, to main dk	9.00 m
Machinery	diesel-electric
Main engines	4 x MaK 9M25 engines
Output	4 x 3,000kW
Propulsion	2 x ABB Compact Azipods
Propulsion power	2 x 4,088kW
Service speed	18 knots
Gross tonnage	abt 22,700gt
Deadweight	9,000 dwt*
Capacities	50 rail wagons 50 trucks and 25 cars
5 train deck lanes	768m total
6 truck deck lanes	450m total
Passengers	abt 480
Crew	57*
Classification	CCS
*unconfirmed	

to be about 3.1 billion yuan (approximately US\$373 million at a 2004 exchange rate) with construction costs around 2.4 billion yuan. This includes the purchase of three ferries, port construction and infrastructure, and a vessel traffic safety control system. The cost of each ferry is around 440 million yuan (US\$53 million).

The Bohai ferry officially started operating at the beginning of November, when it crossed the strait from the new train and passenger terminal at Yangtowa harbour in Lushun, Dalian, to that of Situti Harbour of Yantai. *Zhong Tie Bo Hai 1 Hao* made the crossing with 50 rail freight wagons carrying cargo such as timber and grain.

Weather conditions in the Bohai Strait are difficult and often unpredictable. According to the Xinhua news agency, between 1997 and 2003 eight major shipping accidents have taken place in the area, often called China's 'Bermuda Triangle'. In November 1999, the ferry *Dashun* caught fire, broke up and sank in rough seas and gale force winds near Yantai while sailing to Dalian. Only 22 of the 304 passengers survived in the country's worst shipping disaster in modern times. *Zhong Tie Bo Hai 1 Hao* is designed to be able to operate in winds of up to 40 knots.

Construction work on the series prototype started in mid-December 2004, and *Zhong Tie Bo Hai 1 Hao* was launched in mid-January this year. Sea trials took place in August, after which final finishing of the vessel was carried out in Yantai.

Construction of the second vessel started in July 2005, and its original delivery date was set for January 2007, although this has been put back. According to the original schedule, construction of the third vessel will begin in April 2007 with delivery in August 2008. Tianjin Xingang Shipyard received the order for this ferry in June this year.

On the main deck the vessel can carry a 4,000-tonne freight train with 50 wagons accommodated in five lanes, which aggregate a total length of some 768m. The main casing is arranged near amidships. The train access is aft, through a top-hinged stern door.

Fifty 20-tonne trucks and 25 cars can be transported on the upper deck, which has six truck lanes and a total lane length of 450m. Trailers and cars access the upper open weatherdeck via a shore-based side ramp on the starboard side of the vessel. The hydraulically operated ramp is 29m long and 4.5m wide with a maximum slope of 10 per cent.



Train access is aft, via a top-hinged door



50 freight wagons can be accommodated



The ferry's forward lounge

Passenger access is arranged through an enclosed bridge with a hydraulic raising and extension mechanism. Shenzhen CIMC – Tianda Airport Support Ltd built the ship's two passenger boarding bridges from Sinorail Bohai Train Ferry's facility and became the first manufacturer of ship-boarding bridges in China.

Forward on the weatherdeck and on the three upper decks are the passenger and crew facilities, with the wheelhouse on the uppermost level. The vessel can carry about 480 passengers and 57 crew members. There are 98 passenger cabins, in five different categories: the first-class and the

second-class cabins are equipped with satellite communication telephones and satellite television.

Zhong Tie Bo Hai 1 Hao employs a diesel-electric power plant, and is propelled by two ABB Compact Azipod drives. Service speed is 18 knots with a 25 per cent sea margin. The underflow stern hull has a large centre skeg, and forward there are two tunnel thrusters.

The main genset drives are four MaK 9M25 medium speed diesel engines, each rated at 3,000kW and providing a total output of 12,000kW. The engines are assembled at the Caterpillar Motoren Guangdong factory near Guangzhou, using component packs supplied by Caterpillar Motoren's main plant in Kiel, Germany, to guarantee identical quality.

The Caterpillar Motoren Guangdong facility has manufactured, tested and supplied MaK M453C medium speed engines for propulsion and genset duties since 1996. Guangdong's operations were initiated in 1994 by MaK Motoren and the Guangzhou Diesel Engine factory.

Rising regional and international demand for its MaK M25 medium speed engine for propulsion and genset drive applications stimulated Hamburg-based Caterpillar Marine Power Systems to extend production of the design to China, reducing delivery times and transportation costs.

ABB's propulsion package comprises a pair of 4,088kW Compact Azipod propulsion drives, four 2,880kW main alternators, transformers, one medium-voltage 6.6kV main switchboard, power management system and remote control. Alstom Power Foundry supplied the two 3.6m-diameter propellers for the Compact Azipod units and other Azipod cast components. ABB also delivered a pair of 715kW bow thruster motors.

The contract for propulsion plant for the first two vessels was received in May 2004, and for the third vessel this summer. ABB says that high performance, high quality and safety, with low maintenance costs and initial cost, were the main reasons for the selection of the Azipods for the vessels. The system also provides low noise, low vibration and improved manoeuvrability, the company added.

According to Tianjin New Harbor Shipping, compared with a diesel-mechanical propulsion system, diesel-electric propulsion can save 1,500 tonnes of fuel and 30 tonnes of lubricating oil a year. With current fuel prices in China being about 2,400 yuan (US\$300) per tonne, and lubricating oil prices about 1,000 yuan (US\$125) per tonne, this amounts to savings of about 3.9 million yuan (about US\$500,000) each year.

Zhong Tie Bo Hai 1 Hao is fitted with an Interling-type stabilisation and heeling control system and a pair of Rolls-Royce Neptune 400 folding fin stabilisers. Beijing Highlander Digital Record Technology – a producer of voyage data recorders, speed logs and remote supervision systems, supplied the newbuilding with a range of equipment. **FT**

China's second train ferry

The Bohai Strait crossing is the second train ferry service in China, and also the longest. The first transport ferry service operates across the Qiongzhou Straits in south China to Hainan Island, and was inaugurated in January 2003. Designed by MARIC, this train ferry was built at Jiangnan, and has a capacity of 40 freight wagons on four recessed tracks. Alternatively it can carry 50 five-tonne lorries and amenities provided for 1,200 passengers and 40 cars, plus 120 cars and truck drivers. The vessel has two Wärtsilä 6L32 engines driving Rolls-Royce Aquamaster thrusters.