

NEW HULL DESIGN EXTENDS ASIA RO-RO POTENTIAL

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Recent research in hull form design may be the key to boosting the efficiency of Ro-Ro as a solution to the congestion in China's main ports and economic development zones.

Aluminium designs improve in sea-going capacity

A newly launched stabilised mono hull design – the biggest aluminium ship in the world – holds the prospect of achieving high speed and stable passage in the open sea. These factors have limited the open sea potential of Ro-Ro in the past because better sea holding capabilities necessitated deeper draughts and slower vessels. The new design enables speed but still retains the advantage of shallow draught and access to low technology berths.

The design will have relevance to economically developing zones such as China's Pearl River Delta. While the Pearl River Delta in Guangdong Province has attracted enormous international interest with its rapid economic growth, the growth faces some huge problems related to port congestion and inadequate land infrastructure. Moving freight within the Pearl River Delta is difficult and will only get worse.

The big logistics problem for the Pearl River Delta is that it lies on the opposite side of an ocean inlet to its nearest international port hub – Hong Kong. All freight and containerised cargo must be either moved around the ocean inlet or across it to get to Hong Kong.

The Pearl River enters the sea between Hong Kong and Macau. One marker of rapid development of the Delta is the fact that Hong Kong companies now employ around 11 million workers in the Pearl River Delta. Huge investment is coming into the area from Taiwan based companies and many other foreign companies are moving factories to the area. A large proportion of the manufacturing capacity is destined for export and this is where the problem of port congestion occurs.

Hong Kong, Guangzhou, Shenzhen

The ports which service trade from the Pearl River Delta are Hong Kong, Guangzhou and Shenzhen. Of these ports, Hong Kong has by far the greatest capacity as an international shipping hub. While the other ports are being dredged and developed, it is likely they will take a long time to catch up with the cargo handling capacity of Hong Kong.

Macau lies at the entrance of the inlet on the same side as the Pearl River Delta and is about 35km from Hong Kong. Shenzhen is on the same side of the bay as Hong Kong and Guangzhou is at the furthest extremity of the bay – about 100km from Hong Kong.

This introduces the massive problem of how to move containers around this water obstacle between the Pearl River Delta and the major hub port of Hong Kong.

Currently proposed solutions include a new rail link between Hong Kong, right around the bay to connect with the Pearl River Delta on the western shore. Another solution is to build a 35km bridge from Hong Kong to Macau on the western shore.

The complexities of the rail or bridge link create opportunities for the Ro-Ro solution if only the design limitations of the ships can be addressed. Silting of the estuary of the Pearl River is a problem for creating improved access by deep draught vessels.

Bigger hulls, more truck space

The recent design innovation which may boost the Ro-Ro potential is the advent of new ships with bigger hulls, more space for trucks, faster and with stabilised mono hull design.

The largest of these ships in the world was launched in September 2004 and its size – at 127m in length and beam of 30m – means that it can start to redress some of the limitations previously associated with Ro-Ro. The ship will be delivered to the owner – a Spanish company which will use the vessel in the open sea around the Canary Islands in the Atlantic Ocean in early 2005. The vessel will, incidentally, transit the Indian and Atlantic Oceans in the delivery voyage.

For the first time, this Ro-Ro design brings the potential to carry substantial truck and container loads with 400 truck lane metres available for trucks in this design. The configuration of the truck deck can be altered so that the vessel could become a trucks-only transporter.

The new vessel has a speed at sea of more than 40 knots and a draught of only 4 metres.

In solving the Pearl River Delta's transport needs, this design may have enormous advantages. Firstly, and most significantly, the design is available now and at a relatively short build time. In the case of this ship the contract was awarded in June 2003, construction commenced in September 2003 and launch took place in September 2004.

Fixing the congestion NOW

The potential new road, rail and bridge solutions under planning for the Pearl River Delta at the moment are many years away and the problem of congestion is only going to get worse until these solutions come into effect. Even then, the rate at which economic development is taking place in the Pearl River Delta means that the road lines of communication may become clogged as quickly as they are built.

The effectiveness of a short sea hop using Ro-Ro technology from low technology ports, jetties and ramps in the Pearl River Delta must be appealing when compared with the land transport option. It must be more economical to accept the lower payload of a Ro-Ro ship and achieve a quick round voyage than coping with the problems of land transport.

Transit times from the low technology jetties in The Pearl River Delta, right to the maritime heart of Hong Kong, could be as short as one hour or no more than 2.5 hours. This would beat the long delays involved with a congested road transport move.

The cost efficiencies of Ro-Ro work best where there are short hops between highly developed trading centres – usually a distance of 100km to about 300km. This is just the order of distance involved with the Pearl River Delta.

Ro-Ro potential in Asia generally

Casting the applicability of these new Ro-Ro designs to a wide view - the rest of Asia - some enormous opportunities open up.

Firstly, there are the needs of the coastal China ports which are ideally located to be serviced by such a shallow draught Ro-Ro service. China has 280 ports, including 165 coastal ports and only a few of these are slated for development as world hubs. Many will receive some upgrading but most will remain relatively low technology ports. China's coastal ports lie at intervals which are ideally suited to the Ro-Ro solution. (see inset)

With China's economic expansion there will come an enormous need for transshipment within the country as manufacturing components are moved from factory to factory. This transshipment need may not require the container to pass through a transshipment hub but will require efficient transport. Due to the enormous task of upgrading China's road and rail infrastructure, the coastal sea routes are likely to be heavily used – just as the Yangtze is used as a line of communication between Shanghai and Chongqing for inland water routes.

Secondly, there is the need for short ocean passages to the offshore islands of Asia and within the archipelagos. Bear in mind that the owner of the new ship intends to use it for open sea passage in the Atlantic. With this in mind, it is interesting to look at the sea distances of some of the short hops in Asia.

The new design may suit other ocean passages in Asia which might have previously been regarded as too long or too rough for aluminium catamaran or trimaran design. The potential new economic ocean passages include; the Taiwan Strait if certain difficulties can be overcome, the Korea Strait, The Yellow Sea, the Gulf of Thailand, the archipelago of Indonesia and the archipelago of the Philippine Islands and the Gulf of Mannar between India and Sri Lanka.

Ro-Ro holds the classic solution in these cases of short ocean hops. In a situation of many coastal ports or with inter-island ports, Ro-Ro has the commercial advantage that it is a solution where you capitalise the ship rather than the port infrastructure. A ship is flexible and can service many ports whereas a capitalised port is inflexible – it can only serve one location.

Ro-Ro already plays an important role in China's river trade as can be seen in the case of the Yangtze linking Shanghai on the coast to Chongqing at the extreme inland navigable

end of the river. Minsheng Shipping Co Ltd, which operates 93 vessels including container liners and Ro-Ro vessels, acquired its first Ro-Ro ship for use on the Yangtze in 2000. Minsheng now carries around 60% of total container volume on the Yangtze and 95% of Ro-Ro movements from Chongqing port.

Suitable Ro-Ro routes in China

Waterborne freight within China is projected to increase by about 16% to 17% per annum over the next five years. According to a recent paper delivered by David Byrne, managing director of UK based Transmarine Consultants Limited, around about 38.4% of this trade has been on inland water routes and 61.6% on coastal routes. Both of these types of routes are potentially suitable for Ro-Ro so long as certain limitations of the Ro-Ro ships are redressed.

If the trend continues to highly sophisticated hub ports in Asia and ever larger ships, it is necessary to create efficient distribution of unitised cargoes to, and from, feeder ports and new Ro-Ro designs will play a part in this solution.

While none of the newly designed ships have yet been ordered in Asia, the potential is there for this type of vessel to extend the economic capability of Ro-Ro.

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