

# Moving into deeper water

>> **themed issue:**

Africa

An engineering specialist seeks to solve the high cost of exporting African minerals by building artificial offshore islands

For the vast continent of Africa and its booming economy, its ports are a lifeline. However, a number of factors mean some of the ports are unable to support Africa's growth. As existing ports are becoming more congested, increasing capacity is an urgent requirement, either by building new port facilities or by making better use of existing quays and jetties.

The two main drivers are the import of containers and the export of minerals. Both need tailor-made solutions if the number of containers handled is to be improved and the volume of exports is to be increased.

Because of financial and environmental restrictions, it often takes several years for new quays and jetties to be opened for business. In the interim, the use of dynamic mooring control and smarter mooring techniques can help to reduce the heavy swell and squall problems suffered by



Khalifa port, Abu Dhabi, may be a template for west African development

Abu Dhabi Port Authority

existing ports. These significantly limit the rate at which cargo can be handled. More tests are being done with dynamically-controlled smart mooring systems to increase workability and increase the time window during which containers can be handled. The first results are encouraging, and it looks as though these systems can significantly improve the effective operating time.

Meanwhile, experiments are being carried out at several locations along the coast of west Africa into the benefits of barging minerals out to deeper water and transhipping into bulk carriers. Navigable water depth along most of the west African

coast is restricted to Panamax vessels, but while the Panamax is the workhorse of the dry shipping industry it's not ideal for shipping large quantities of ore and coal from west and east Africa to China or India.

**40%**

Cost saving by shipping coal from Mozambique to China in a Capesize

This is not only because of the charter rates, but also the fuel consumption and related costs. Initial calculations show that when a Capesize can be used

instead of a Panamax, the cost/tonne for shipping ore or coal to China can be reduced by more than 40% each trip. This is a substantial saving and therefore is a key element in assessing the best solution for the overall infrastructure arrangement when bringing minerals from the mine to the coast and from there to the end-user.

Bechtel, the construction, engineering and project management company, has developed a new approach that could help improve shipping in west Africa. Taking into account all transport modalities and their costs and benefits, technical, environmental, social and sustainable, the company has come up with the Multi User Offshore Hub (MUOH) concept.

This consists of an offshore, artificial island protected by a breakwater, using technology the company employed at Khalifa port in Abu Dhabi. It has a smart terminal arrangement and docking concept, alongside which ocean-going vessels and barges can be moored. Bechtel has already received enquiries about the MUOH proposal from several mining companies interested in both the environmental and cost benefits of sharing port infrastructure.

"At the moment," said Marco Pluijm, senior port specialist at Bechtel, "it is much

## Europe goes tactical on port services

The commission takes softly-softly approach on port reform legislation

The European Commission laid a lot of emphasis on the need for the European Union's lesser ports to improve their

performance in the initiative it announced last week but gave little information about the legislative measures it is planning to achieve its objectives.

Thus, it said 319 key seaports out of a total 1,200 would be helped by its initiative, enabling them to handle a bigger share of

the 50% growth in cargo volumes it predicts for the European Union between now and 2030.

At present, the commission said, the three port market leaders – Rotterdam, Hamburg and Antwerp – handle one-fifth of all seaborne traffic transiting in and out of the European

Union, causing congestion and extra costs for shippers, transport operators and consumers.

The lesser ports need to learn from the best performing ports, it said, promising that the guidelines and legal changes it will propose will help port operators upgrade their services

cheaper to build an offshore port than a number of different coastal ports. I think we can build a port island with the right infrastructure and internal arrangements for the same amount of money as one coastal port, but ours would be for two users.”

The concept is based on using a country's existing infrastructure resources to best effect, thereby limiting the ecological footprint as much as possible, such as by

combining rail and river barging where feasible. Relatively small-scale experiments are already under way in Liberia with elements of this approach. These have already had some success and, when scaled up, could be significantly increased.

In Gabon, the barging of minerals such as manganese to bulkers moored offshore has already started on a small scale from the port of Owendo.

Bechtel has been active in Gabon for a number of years,

assisting the government with the

implementation of large infrastructure projects including ports, harbours and river navigation opportunities.

The company sees opportunities for further developing the MUOH concept in the Gabon-Cameroon region and in the Guinea-Liberia region.

Mozambique could also stand to benefit. There are a huge number of coal mining concessions in the Tete region. Each concessionaire is looking into dedicated 'pit to port' infrastructure solutions. It is understood that the Mozambique government has decided to focus on developing multi-user transport corridors instead of individual facilities.

“Based on the idea that the whole transport chain is taken into account, initial calculations show that combining rail and barging can lead to an overall cost reduction of about 40% in investment costs and 30% or more in operational costs/tonne for shipping coal from Mozambique to China,” said Pluijm.

Key to this approach is that barging is used not only for bringing the minerals to the coast, but also slightly further offshore to the offshore hub, serving Capesize vessels, when that would be a requirement. In Mozambique, the solution would be that transport is initially done from the mine to

the River Zambezi via a short rail track and then into barges sailing to a small coastal port facility, initially loading Panamax vessels to get exports going. With increased mine output capacity, the barging and MUOH concept is further developed. Barges become more sophisticated, perhaps self-offloading, and run direct to bulk carriers at offshore hubs.

### Dynamic mooring

In order to further improve overall transshipment safety and workability as well as its MUOH concept for west and east Africa, Bechtel has initiated a joint industry research project, focusing on dynamic mooring control and response, in line with testing in several west African ports.

This new research project is expected to run for two or three years and is open to governments or commercial parties interested in making a contribution to developing an adequate mooring system for these heavy swell-dominated coasts.

Both the Bechtel MUOH concept and the outcome of the Bechtel-led research will be instrumental in upgrading and expanding port infrastructure needs in Africa – maximising the economic output of this vast continent while at the same time minimising its ecological footprint. **E**

**‘We can build a port island with the right infrastructure for the same amount as a coastal port’**

Marco Pluijm

and facilities and give them more financial autonomy.

The commission was vague, however, about the content of the legislative proposal it will be submitting to the European

Parliament and European Council as part of the initiative.

It promised measures to promote openness in procedures to select port service providers, fix charges and make use of

public funding, rules to prevent price abuse by port operators, and greater freedom for ports to levy infrastructure charges.

As regards the liberalisation of access to port services

– controversy over which has prevented past commissions from carrying out previous port reform plans – a tactical approach has been adopted this time. Rather than risk confrontation with Europe's dockers and other port workers, the commission has left the question of access to the dock labour market to a social dialogue committee for ports, which is to be set up shortly. **E**

**‘The proposals today will bring Europe's port services into the 21st century, help attract investment and create jobs where they are most needed’**