



What price safety?

By DR TERRY O'BRIEN, executive director, OMC International

channels and allow them, in most cases, to go deeper than allowed by static rules and therefore safely load more cargo.

So what is the introduction of OMC's technology worth? Just ask PHPA. Their website http://www.phpa.wa.gov.au/dukc_information.asp says that our system "generates in excess of \$25 million dollars per annum in revenue to the state". PHPA also says: "It is initiative of this type that keeps PHPA to the forefront of bulk-handling ports." It has been estimated that the new system accounts for an average of 7 per cent of the tonnage shipped out of Port Hedland and the revenue generated will continue to increase as PHPA's throughput of iron ore continues to grow strongly during the coming years.

Other big news out west is that Cape Lambert is now fully commissioned as a licensed DUKC port. This development is significant because it is Rio Tinto's main growth port. In Rio Tinto's media release (8/02/2012) chief executive Sam Walsh announced a commitment of US\$1.2 billion towards the extension of port and rail operations at Cape Lambert so as to take the capacity of its integrated Pilbara port operations from the present 225 Mtpa to 353 Mtpa before July 2015. Our technology will assist this rapid expansion by providing increased cargo uplifts on most sailings at Dampier and Cape Lambert, together with increased consistency in shipping operations across both ports and improved management of grounding risks.

A recent ministerial media statement (2/02/2012) announced that to improve efficiency WA ports will be consolidated under the control of four regional port authorities commencing in 2014. Port Hedland, Dampier, Cape Lambert and other proposed new ports in the Pilbara will be under the control of one such authority.

I see the interests of OMC and the Pilbara ports as increasingly aligned in maximising the operational cargo uplifts associated with the mammoth growth of these ports. OMC is investing considerable funding and endeavour in the development and refinement of new products such as DUKC Optimiser to more fully meet the evolving needs of these mega ports.

Torres Strait system operational

It's not all about big profits for the big players. After all, Australian Maritime Safety Authority (AMSA) installed our technology in Torres Strait to enhance the safety of deep draught vessels transiting these shallow and environmentally sensitive waters. These ships face many challenges to safe navigation due to the numerous reefs, shallow waters, complex tides and strong tidal streams. This is the first time that this system is being used in a complex and remote coastal environment in Australia.

AMSA is the first client to use our new web-based next generation product suite, DUKC Series 5, which allows accessibility via the internet. This advanced functionality gives authorised users worldwide easier access to the system. They can now execute UKC-related tasks via the web as well as the traditional desktop-based user interface. The new modular framework also enables users to access only the self-contained modules relevant to their specific needs, whether it be long-term voyage planning, real-time onboard pilotage applications, or shore-based monitoring of multiple vessels by VTS in real-time.

In its media release issued on 16 December 2011, AMSA declared this system was now operational and will allow "vessel operators and coastal pilots to plan the safe and efficient passage of deep draught vessels".

Following AMSA's lead, we believe a growing number of Australian and international ports and waterways will install, or upgrade to, our latest web-based Series 5 technology to allow easier access to our technology, thereby enhancing its use as an essential risk mitigation tool for UKC management.

Fremantle Port

Just last year, OMC helped Western Australia's Fremantle Port Authority with the inner harbour channel deepening project and reconfigured our software navigation system to allow the port to take full advantage of the dredging. According to Fremantle Port Authority's 2011 annual report, "The deepening to 14.7 metres has increased the maximum draft capability for container shipping from the previous 12.7 metres to 14 metres, using Dynamic

Rio Tinto, BHP Billiton, Fortescue Metals Group. For those who read business stories online or in national and international newspapers, it's obvious these big mining companies are still enjoying big profits in Western Australia.

If you're time poor, just log onto Port Hedland Port Authority's (PHPA) website and read its 2011 media releases about tonnage records continuing to tumble for Port Hedland which is the world's largest bulk export port. On 15 November 2011, the Fortescue Metals Group (FMG) loaded vessel, the *Wugang Innovation*, broke the record for the largest iron ore shipment to leave Port Hedland. Loaded with 247,906 tonnes of iron ore, it broke – by 48 tonnes – the previous record set five months earlier when the *Cape Infinity*, a BHP Billiton loaded ship, left Port Hedland carrying 247,858 tonnes of iron ore.

What you often won't read is the real story behind the story – that these ships sailed under OMC International's DUKC (Dynamic Under Keel Clearance) advice. Our proven technology is so accurate that, under extreme weather conditions, a 250,000 tonne ore carrier can negotiate a channel within a metre's clearance to the seabed.

Just one centimetre of extra under keel clearance means 170 tonnes of extra cargo on a ship the size of the *Wugang Innovation* or, if you get it wrong, a touch-bottom incident! Our customised DUKC systems mathematically predict how much UKC ships require as they transit shallow

Underkeel Clearance draft-enhancing technology. The ability to service the larger, more efficient ships fully loaded means the same volumes of cargo can be carried on fewer ship visits, with benefits in terms of economies of scale, fuel savings and reduced greenhouse gas emissions.”

Progress in South America

OMC is now starting to make headway in South America following meetings with various port authorities, regulatory bodies and pilotage providers in the region. This past year, our senior engineer and South American manager Dr Matthew Turner and myself have focussed on demonstrating the value of our technology for selected ports in Brazil and Argentina.

Given the many international headlines about the Very Large Ore Carriers (VLOC), also known as Valemax vessels, which are capable of transporting 400,000 metric tonnes of iron ore (with draught increase rates in excess of 200 tonnes/cm), there are obvious growth opportunities for DUKC in the Brazilian ports from which these giant ships will load in coming years.

North American ‘Graveyard of the Pacific’ contract

Last year, OMC announced the winning of our first North American contract, a DUKC desktop study, for the Columbia River Bar, a treacherous waterway known as ‘the Graveyard of the Pacific’. This study was commissioned by the Columbia River Bar Pilots with funding from the Oregon Department of Transportation. This aptly nicknamed Bar, at the mouth of the Columbia River which flows into the Pacific Ocean, has claimed about 2000 ships and 700 lives since 1792.

Our maritime engineers are continuing to collect extensive data and measurements in Columbia River Bar during the North American winter as it is so important for the maritime industry to get such data in these particularly challenging conditions. We believe this valuable information is not available elsewhere in the world.

Mooring analysis, design and operation

OMC continues to be heavily involved in the analysis, design and operation of mooring systems where moored ships are exposed to swell or long wave effects, associated with the hydrodynamic forces caused by passing ships or ocean swell. Many of the new port developments along the West Australian coast, such as the outer harbour at Port Hedland and the proposed new berths at Cape Lambert B, have involved use of our technology as an essential component of the jetty design process.

In addition, our berth warning systems at the Kurnell offshore mooring facility at Botany Bay and at the port of Hay Point continue to provide real-time operational warnings on forecast wind and wave conditions which may cause vessels to break lines at the berth or damage fenders, causing unacceptable OH&S risks to personnel and damage to wharf structures and the vessel itself. These systems have been in operation since the late 1990s, the Kurnell system having been installed in



Terry O'Brien and his wife Pauline, Marco Gamaro from Samarco Mineração S.A, Dr Matthew Turner of OMC inspect Samarco's iron ore facility at Port of Ponta Ubu, in Espirito Santo, Brazil

late 1997 following the near-catastrophic breakout of the *World Kudos* during a severe swell event earlier that year. Recent developments in our swell forecasting models used in many of our DUKC systems are now available for use in our berth warning systems and will considerably enhance the operational value of these systems.

A recent example where such forecasting in a berth warning system may have prevented a marine catastrophe is the recent loss of the *MV Tycoon* at Christmas Island in January 2012, apparently caused by a rapid growth in wind and ocean swell causing excessive vessel motions leading to breakage of ships lines, ending with the loss of the ship on the cliff face.

Product development

A significant proportion of OMC's earnings are invested each year in research and development of DUKC-related products.

OMC's staff of more than 30 highly trained engineers, naval architects and software engineering/IT personnel are continuing to work on bringing new products to market to improve the safety and efficiency of the Australian and international shipping industry. This includes a ship scheduling tool, DUKC Optimiser, which can schedule multiple ships on one tide, finding the solution that maximises total tonnage for the tide while observing constraints such as vessel priority protocols and tug availability.

This optimiser tool will allow ports to reduce the workload for their schedulers, and also increase their port capacity in the most cost-effective manner.

International industry standards

A major personal effort in 2011 has been with providing technical input to PIANC working groups dealing with development of international guidelines and standards for channel design (WG 49) and the use of hydro/meteo data for port operations, especially real-time determination of tidal windows for shipping channels (WG 54).

PIANC is widely regarded as the premier world authority on the design and operation of port structures and facilities. The reports of its various working groups on technical, economic and environmental aspects related to navigation in maritime and inland waterways form a body of knowledge

which, in effect, are international industry standards for the safe and economic design and operation of port structures and facilities, such as shipping channels.

The first working group (WG 49) is tasked with updating the well-known PIANC guidelines on channel design (WG 30 report), taking account of the increase in ship size since publication of that report in 1997.

The second working group, which I have had the privilege of chairing during its work over the past four years, is a new area of interest for PIANC. It relates to the very important topic of measurement, forecasting and application of hydro/meteo data for UKC management tools such as DUKC as well as for the safe operation of moored vessels and other port marine activities such as the berthing/unberthing of vessels.

Both working groups have involved international experts in various related fields working together for several years, meeting at least twice a year, usually in Europe. It is expected that final reports from both working groups will be published by PIANC by the end of this year.

Push for standard safety implementation

We are grateful that the shipping industry acknowledges the extensively validated scientific evidence and safety track record of our proven, real-time UKC management systems and supports our quest for them to become standard safety requirements for UKC management around the world.

The growth of our WA iron ore ports and our east coast coal ports will put increasing pressure on the shipping regulators to use tides more efficiently and reduce dredging costs as cargo volumes ramp up.

Our systems have been safely operating in ports for nearly 20 years. In the world of shipping, the bottom line should always be safety before profits – whatever the price. After all, grounded ships blocking access channels will cost big time!

** In June 2010, in the Queen's Birthday Honours List, OMC founder and executive director Dr Terry O'Brien, who is a Melbourne engineer and former academic, was awarded a Medal of the Order of Australia (OAM) for services to the maritime transport industry. ▲*