



University partnership recognises OMC's expertise as world-leader in real-time UKC management

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

A prime concern of shipping is maintaining a safe under keel clearance (UKC) to avoid the risk of a grounding. In May 2017, OMC celebrated its 30th anniversary since my resignation from the University of Melbourne to establish OMC, and to develop the engine for a working dynamic UKC system (DUKC®) for commercial shipping. It became operational and first replaced static UKC rules in the early 90s. Moving

full circle, case study examples of our latest Series 5 technology were presented in a new engineering course at the University of Melbourne in 2017, which reflects a growing awareness of the value of our technology to our port and shipping sector. It's very specific content is focussed on the practical application and experience of our UKC management technology.

OMC believes that this intensive week-long postgraduate Port Access and Navigation unit, developed with the support of Ports Australia and input from the maritime industry, will become a standard education tool for future maritime engineers. It is an elective in the Civil, Environmental and Mechanical Engineering Masters programme at the University, and is also part of the Port and Harbour Engineering Graduate Certificate,



which is the only formal qualification in port engineering offered in Australia and New Zealand.

As University of Melbourne's Ocean Engineering Professor, Alexander Babanin, said when announcing news of this course, first taught in September 2017: **"Under keel clearance is the single most important issue of shipping in ports, channels and shallow areas, which is not taught in standard engineering programmes at universities and so it is a must for this port engineering course."**

The course content is shaped by this very specific focus on the vertical dimension where, depending on the size of the ship, 1 centimetre of additional draft can mean up to 150 tonnes of extra cargo.

We are very fortunate to have industry experts such as Captain Eric Atkinson OAM, president of the International Harbour Masters Association from 2012-2014, to co-ordinate and deliver some of our course content. Port regulators and shipping companies will also contribute to the course.

OMC is keen to further develop content with Professor Babanin, the course convenor and original developer of this unit, previously taught at Swinburne University for 10 years.

Our partnership with the University of Melbourne is part of our ongoing strategy, through teaching and

involvement in relevant research projects at a tertiary level, to forge collaborative industry partnerships which could strengthen the possibility of our Federal Government establishing a Melbourne-based Centre of Excellence in Maritime Engineering.

Sharing expertise and experience with industry

A related development which has facilitated education, collaboration and communication within our industry has been the opportunity to participate in industry workshops and forums. The Ports WA community convened a Biennial forum to provide an opportunity for WA "port stakeholders to closely engage with a substantial number of decision makers within the ports sector". These included port chief executive officers, customers, service providers and government representatives.

The agenda of the 2017 'Safe Ships - Safe Ports' forum, hosted by the Pilbara Ports Authority (PPA), and run sequentially with the Ports WA Forum over four days, provided an overview of the latest developments in the PPA-managed ports of Ashburton, Dampier and Port Hedland. Key themes included risk, regulations and technological advances. General Manager Operations Captain John Finch said success for all port users is

based on "a shared vision of safe and efficient operations within the port environment". OMC addressed this

issue with a presentation on its latest web-based Series 5 technology.

Similarly, OMC is offering users from our Australian DUKC® ports an opportunity to share their operational experiences with each other and with OMC personnel. The first one-day meeting was held for all our Western Australian port users in Perth, in November 2017. This year we will host further annual gatherings for our Australasian users regionally, or at our Melbourne headquarters.

Delivering tonnage records and sailing ships deeper

Port Hedland has a large tidal range and long transit time and OMC continues to work closely with PPA to optimise clearance depths and make the most of each high-tide, to send out as many of the larger iron ore carriers as possible, under DUKC® advice. One of our first significant joint achievements was in 2015 when the port of Port Hedland used our technology to sail a record eight restricted Capesize ships on the one tide. In March 2017, in a joint effort with PPA, our system helped enable the largest ever iron ore shipment – 270,006 tonnes – to leave Port Hedland on the Fortescue Metals Group loaded ship HL *Tubarao*, at a record sailing draft of 19.95 metres.

Meanwhile, at the bulk port of Geelong, the Victorian Regional Channels Authority adopted Series 5 in 2015, as a way of admitting larger ships with more cargo, without requiring any changes to

Port Hedland





the channel infrastructure. In the right circumstances, ships may be allowed up to 12 metres draft, and that means a cargo uplift of 1350 to 3000 tonnes per ship. For one of the port's shippers, Viva Energy, each extra 10 centimetres in ship draft results in a saving of about \$1 million a year.

On 11 October 2017, an Exxon tanker, the *Aspen Spirit*, sailed safely into the port of Melbourne, as the deepest ship that has ever come into the port. Two OMC engineers on board undertook GPS validation and the full scale measurements provided excellent correlation with the results predicted by the DUKC® system.

Expanding through the logistics chain

Since 1995, Port Hedland, the world's largest bulk export port, has used our technology to help sail ships which are only 90 centimetres from the bottom of the seabed. The 45 kilometre long Port Hedland channel is 183 metres wide at its narrowest point. PPA's chief executive officer, Roger Johnston, has described it as "like threading the eye of a needle" and that "if you run 5 degrees off true at the Port Hedland channel you will ground your ship in 26 seconds". He added that this is where "the DUKC® system comes in".

Two recent research developments to which PPA and OMC have jointly contributed, and for which our methodology is, in both cases, used conjunctively with PPA's input are: The Channel Risk and Optimisation Project (CROP), a PPA project, and our Dynamic Port Capacity Model (DPCM®).

PPA's CROP project ran for three years and provided the optimised design basis for a \$120 million dredging project, with

the primary aim of mitigating the risk of disruption to the port should an accident block the channel. It will provide passing lanes and refuge zones.

DPCM®, an innovative tool developed by our research and development department over the past five years, involves the embedment of our Series 5 system within a model of the many diverse maritime operations which occur at Port Hedland. Its purpose is to assess the impact on port capacity of discrete changes to each operational or design variable, for example, the availability of tugs and pilots.

Analyses undertaken using DPCM® is the basis by which the declared port capacity was increased by 16 per cent in 2015.

OMC's continuing role in UKC education and research

To ensure that Australia remains internationally recognised as a centre of UKC risk mitigation and shipping efficiency management, OMC continues to support scientific research. In a further collaboration with the University of Melbourne in early 2017, our CEO, Peter O'Brien, is leading a navigational aid modelling project with other industry partners.

After winning AMSA's competitive tender for a UKC management (UKCM) system for the international waters of Torres Strait in 2010, and supporting the operational system since 2011, OMC has been invited to provide its DUKC® technology and experience to guide the current Under Keel Clearance Management Information Project Team (UKCMPT). The brief is to develop an IHO S-129-based product specification for UKCM information to enable the

outputs of UKCM services to be displayed for users. This Project Team comprises a number of IHO member States including Sweden, France, Korea, USA, Russia, Finland, UK and The Netherlands, and is chaired by a representative from the Australian Maritime Safety Authority (AMSA). This work is expected to be completed in 2018.

In May 2017, OMC moved its Melbourne headquarters to nearby larger premises to allow for the employment of additional experts, postgraduate students and short-stay collaborative visits with global maritime partners.

The future

With our unique long track record of leading industry experience and innovation in UKC management, OMC now seeks State and Federal Government recognition and support of our Australian-developed technology, which has generated millions of export dollars.

While we have always considered the horizontal manoeuvring aspects operationally, this is now requiring greater focus with the wider and longer ships navigating draft-restricted approach channels. OMC's more comprehensive approach of designing both the optimum channel width, as well as the depth, will provide a one-stop shop for the optimum design and operation of shipping channels and manoeuvring basins.

Finally, I would like to conclude by saying that the International Maritime Organisation's theme for World Maritime Day in 2017 – 'Connecting Ships, Ports and People' – is a timely reminder of why our company continues to grow its specialist maritime engineering workforce in response to the needs of the shipping industry. Ships are getting larger and it is crucial that our industry's potential leaders are better informed, and our technology, with its safety record of more than 160,000 deep-draft sailings worldwide, is recognised and supported by our Government.

In March 2018, OMC celebrates the 25th anniversary of the implementation of the first DUKC® operational system in the coal port of Hay Point, Queensland, and we thank the Australian shipping industry for its trust and support in the evolution of our technology, from its initial focus on planning deeper sailings and wider tidal windows, to now include advanced onboard risk mitigation functionalities. ▲