

OMC International celebrates its 30th anniversary with move to new headquarters

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Australian maritime engineering company OMC International (OMC), the recognised world leader in realtime Under Keel Clearance Management (UKCM), is celebrating its milestone 30th anniversary with a move to larger Melbourne headquarters.

Founder and Executive Director Dr Terry O'Brien AM said OMC has moved from Harper St to nearby 126 Trenerry Crescent, Abbotsford to house its growing workforce of more than 50 employees, as well as to allow for postgraduate students and short stay collaborative visits with global maritime partners. "We are hiring more staff to meet a growing domestic and international workload, a response to an increasing recognition of our DUKC® e-Nav technology as the industry standard for safe and efficient real-time management of UKC," he said.

OMC's customised DUKC® systems are operational in some of the largest bulk, container and multi-cargo ports in the world, including the Pilbara iron ore ports in north Western Australia (beneficiaries include BHP Billiton, Rio Tinto and Fortescue Metals Group) and in some of the world's most important waterways, including Torres Strait and Canada's St Lawrence River from Montreal to Quebec City.

DUKC® innovator Dr O'Brien pioneered his first system during six years of development and testing before it became operational at the coal export port of Hay Point, Queensland in March 1993. It was the first dynamic UKC system implemented anywhere in the world and monitored the UKC until 12 hours prior to the ship's departure from the berth. It delivered economic benefits of more than 30cm extra draft compared to the existing Static UKC rule for most sailings. During the following years of further incremental system refinements, the increased maximum draft allowed more cargo to be loaded in favourable swell and tide conditions.

"In many cases, DUKC® enables large ships to sail up to 1m deeper than permitted by traditional and necessarily conservative Static rules, and not only to load more cargo safely but also to sail with wider tidal windows," Dr O'Brien said. "The concept of sailing with less water under the keel was and still is a concern for some Regulators but DUKC® is always safer than Static UKC rules because OMC's real-time technology considers all the dynamic variables - as well as ship size - in the UKC decision making."

Sailing increasingly larger ships closer to the seabed demands impeccable attention to detail and Dr O'Brien stressed that OMC's extensive experience in screening all input data in a wide variety of port settings and environments around the world provides certainty in this first step in customising a system for a new port or waterway. He said OMC has implemented a metocean processing and Quality Assurance framework based on the international guidelines 'Quality Assurance of Real Time Oceanographic Data'.

OMC's DUKC® offers a reliable and comprehensive solution for maintaining a safe UKC while sailing through depth restricted channels, which is fully validated by its unique track record of safe sailing - over 24 years - with no touch bottom incident. This



Australian technology, developed in house, has contributed significantly to the safety and efficiency of shipping bulk and container cargo, earned thousands of export dollars while remaining unmatched by any other emerging competitor.

No other maritime organisation offers such a specific focus on the vertical dimension of UKC management. Under the continued leadership of Dr O'Brien and his son Peter, who manages the company's day-to-day operations as CEO, the OMC team continues to develop and support new functionalities for DUKC® technology which is operational in 22 ports and waterways around the world.

The latest release is webbased DUKC® Series 5 which is now operational in 11 of these ports and waterways. Dr O'Brien said that in addition to today's upgrade at Hay Point (fittingly the first DUKC® port) and last week's commissioning of an upgrade for Geraldton, Series 5 has been rolled out to Rio Tinto's Cape Lambert and Dampier ports last year; to Napier, Newcastle, Arrium Spencer Gulf, Whyalla and Geelong in 2015, Fremantle and Montreal-St Lawrence River in 2014, Port Hedland in 2013 and Torres Strait (AMSA) in 2011.

The web-based Series 5 System uses AIS to provide continuous real-time monitoring of UKC between berth and fairway. It takes into account all the dynamic variables, such as tides, waves and currents, affecting the net amount of water under the keel at each point on the transit and most importantly allows speed changes throughout the transit to minimise squat. OMC provides critical monitoring and support of its DUKC® ships on the water 24/7, 365 days a year.

Efficiency gains for users of DUKC® Series 5

While maintaining safety is always OMC's first concern, the recent advances in its Series 5 systems have contributed to significant economic gains for its users. For example, DPCM® (Dynamic Port Capacity Model) is an optional stand-alone extra capability to DUKC® Series 5 and helps maximise port throughput and channel capacity. The DPCM® has been applied at Port Hedland - the world's largest bulk export port - and helped increase modelled port throughput by about 80mtpa for a minimal investment. Also recently, in a joint effort with Pilbara Ports Authority (PPA), OMC's Series 5 system recently helped enable the largest ever iron ore shipment -

270,006 tonnes on the Fortescue Metals Group loaded ship HL TUBARAO - to leave Port Hedland at a record sailing draft of 19.95 metres.

"OMC continues to work closely with PPA to optimise clearance depths and make the most of the highest part of the tide to send out as many of the bigger iron ore carriers as possible," Dr O'Brien said. "One of our most significant joint achievements was in 2015 when a record eight ships sailed for the first time on the one tide under DUKC® advice from Port Hedland, which has a large tidal range and long transit time."

Meanwhile, at the smaller regional bulk port of Geelong, the Victorian Regional Channels Authority adopted DUKC® in 2015 as a way of admitting larger ships with more cargo, without requiring any changes to 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 10cm in ship draft results in a saving of about \$1 million a year.

In February, DUKC® technology played a key role in helping another shipper GrainCorp set new tonnage records for its Geelong operations, thus improving the global competitiveness of Victorian grains. Under DUKC® advice the Nord Pollux sailed with more than 61,900 tonnes (biggest single shipment of canola fully loaded in Geelong), the Tomahawk departed carrying almost 61,800 tonnes (biggest single shipment of wheat fully loaded in Geelong) and the Twinkle Island sailed with about 62,500 tonnes of barley (largest shipment of the grain fully loaded in Geelong).

Greater awareness of DUKC® as a risk mitigation tool While recognising the huge economic benefits of DUKC® technology, Dr O'Brien said many ports and safety authorities were increasingly seeing the huge safety advantages of installing customised systems as a risk mitigation tool. "This capability was the main reason why Port of Melbourne Corporation (PoMC) implemented our technology after a long thorough process of independent validation and trialling," he said. "This proof of the capability of our technology to accurately manage the UKC of large ships transiting the sometimes treacherous entrance to Port Phillip Bay, one of the world's most challenging waters for ship navigation, increased awareness of its safety advantage. What must be remembered here with OMC's focus on the vertical dimension of UKC is that, while it is a challenge to model the ship as it transits the waterway in real-time, it has the potential to offer often significant economic and environmental benefits while mitigating the risk of a grounding."

Greater awareness of DUKC® as a conjunctive dredging design tool

Dr O'Brien said OMC's technology also minimises dredging by literally taking ships deeper on a computer screen. Over the years, DUKC®'s methodology has been successfully used to design the vertical dimensions of a new channel, or to deepen an existing channel, so as to minimise channel dredging quantities and associated environmental effects. When a DUKC® system is already installed in a port, DUKC® can increase port capacity with less capital dredging because this software can be used conjunctively with dredging to create the channel depth profile which matches the UKC requirements throughout the transit so that the amount of material dredged is matched to the depths required for the ships transiting.

"While it is true that the most optimal dredging design is possible only when a DUKC® operational system has been installed, this cost is value adding and is amortised into the savings in dredging costs and into operational efficiency gains," he said. "In the Port of Taranaki, New Zealand, OMC reduced the port's planned dredging costs by approximately 50% through the introduction of DUKC®."

Over the years, OMC has won dredging optimisation studies for a number of ports including Darwin, Anketell Point, Cape Lambert, Oakajee and Port Hedland. Dr O'Brien said OMC does ongoing work with PPA and Rio Tinto on targeting the dredging required to optimise productivity.

He said that a "key part of OMC's maintenance and support is managing the port's bathymetric data and siltation issues and we are working regularly with a number of our clients, particularly after storms or cyclones, on managing changing bathymetry. It is a standard approach of OMC to provide support services to analyse and update within days the bathymetry data used by the DUKC® system as new surveys become available thus providing quick-turnaround emergency bathymetric updates."

R&D Initiatives

Dr O'Brien said OMC's R&D Department continues to develop new products and solutions in response to user need. These include OMC iHeave® which measures ship motions in extreme weather conditions. Ports including Brisbane, Melbourne, Geraldton, Portland, San Francisco and Halifax have used OMC iHeave® for highly accurate recordings of real-time ship motions in large swells where traditional methods of measuring wave responses by placing a DGPS unit on the bow are too risky due to the heavy seas. "Having a good database of measured wave response motions clarifies whether or not a UKC problem exists," Dr O'Brien said. "These can also be used by ports for validation needs such as, for example, the introduction of large container ships."

OMC plays leading role in UKCM information exchange

As OMC celebrates its 30th anniversary this month, it continues to play its leading role as the developer and operator of real-time UKC systems. In recognition of its international standing, OMC has been invited to participate as the Expert Contributor to new developments in UKC management information exchange for e-navigation. OMC is providing its technology to lead the current IHO S-100 Under Keel Clearance Management Information Project Team (UKCMPT) whose 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 (IHO, 2015). 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.

This international recognition of the leading role of OMC in the development of UKCM systems builds upon the earlier recognition by PIANC in inviting Dr O'Brien to participate as the only Australian representative on international Working Groups for the 'Harbour Approach Channels Design guidelines' (PIANC Report No. 121 published in 2014) and 'Use of HydroMeteo Information for Port Access and Operation' (PIANC Report No. 117 published in 2012.) OMC is also an

industrial member of IALA, and participates in the work of its VTS and e-Navigation committees.

Looking ahead, Dr O'Brien said that as other companies start to enter the niche business of real-time UKC technology and make claims that they can deliver reliable and valid risk management, it is crucial that government and maritime safety authorities should benchmark any new proposal against the only proven UKC management system which has significant long-term validity - that is a long track record of safe sailings with no groundings.

"Our Australian technology is world's best practice for modelling the critical vertical dimension of UKC and there have been more than 160,000 transits worldwide using DUKC® advice without a single grounding incident in the past 24 years," Dr O'Brien said. "There is a DUKC® assisted ship sailing somewhere in the world every hour which is well worth celebrating!"

*** On 16 November 2015**, OMC's maritime technology wins the 2015 International Bulk Journal (IBJ) Safety in Bulk Handling (Marine) Award, announced at a dinner in Antwerp.

*** In the Queen's Birthday Honours List in June 2015**, OMC International Executive Director Dr Terry O'Brien is appointed a Member (AM) of the Order of Australia for "significant service to maritime engineering, to the development of innovative marine navigation equipment and to education".

*** On 19 November 2014**, OMC Executive Director Dr Terry O'Brien AM is inducted into the Australian Maritime Hall of Fame for "making an outstanding contribution to Australia's maritime industry" during an impressive career spanning more than 50 years.

*** On 19 November 2012**, at an awards ceremony dinner in Hamburg, OMC wins the 2012 IBJ 'Innovative Technology' Award for ship motion measurement instrument OMC iHeave®.

