



OMC's innovations are key contributors to global shipping safety and productivity

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

The IMO warns ship masters on bauxite liquefaction dangers. 8th Co-operation Forum addresses key issues relating to Straits of Malacca and Singapore. These two news headlines published in 2015 further validate the importance of OMC International's world-leading research into Under Keel Clearance (UKC) management solutions, and into commercialising new innovations.

For example, the ongoing danger of liquefaction of iron ore fines was recently highlighted in September 2015 when the International Maritime Organization (IMO) issued a warning to ship masters about the possible dangers of liquefaction of bauxite cargoes. This followed the release of findings from a marine safety investigation into the loss of the Bahamas flag bulk carrier *Bulk Jupiter*, suggesting that liquefaction of cargo led to loss of stability. The *Bulk Jupiter* was carrying 46,400 tonnes of bauxite when it sank rapidly in January 2015, with 18 fatalities.

Industry research is still ongoing into the causes of liquefaction and OMC is contributing to this understanding with the development of our lightweight self-contained ship motion measurement instrument OMC iHeave®. This device continually monitors the motion of the ship in six degrees of freedom and allows calculation of the local motions and accelerations experienced by cargo at arbitrary hold locations, providing data which can feed into an analysis into the likelihood of liquefaction of the iron ore fines.

Interestingly, a major iron ore company has used five OMC iHeave® units to measure vessel motions on ships transiting the world. In total, 21 voyages were recorded, including iron-ore laden

voyages from Port Hedland (Western Australia) to Port Kembla (NSW), and Whyalla (South Australia) to China, with about 250 days of ship motion data processed.

Ports including Brisbane, Melbourne, Geraldton, and Long Beach and Portland in the United States of America have now used OMC iHeave® for highly accurate recordings of real-time ship motions in high swells, where traditional methods of measuring wave responses

are not possible. For those ports that have an operating DUKC® system, this provides an easy method of gathering a large dataset of DUKC® validation measurements. For other ports, using OMC iHeave® helps them to better understand the real-time motions of ships transiting their ports, and therefore the appropriateness of their operating rule.

On 19 November 2012, OMC iHeave® won the 2012 International Bulk Journal (IBJ) 'Innovative Technology' (Marine)



OMC's iHeave® ship motion measurement instrument



A deep draught, capesize iron ore carrier

Award, announced at a dinner in Hamburg.

OMC wins SOMS study

OMC's strategic focus on research and development is also helping to position our Melbourne-based maritime engineering company, as an important contributor to groundbreaking global research projects.

For example, OMC has also been actively involved in investigations of the use of an advanced Under Keel Clearance System for the Straits of Malacca and Singapore (SOMS). The SOMS are extremely busy and navigationally complex waterways with a transit time of approximately 20 hours. The SOMS are administered by the three littoral States of Singapore, Malaysia and Indonesia and are a very important global shipping waterway with many stakeholders. This important shipping lane carries about one third of the world's traded goods.

OMC was awarded a first contract in March 2013 by the Maritime and Port Authority of Singapore on behalf of the Tripartite Body representing the Straits to investigate the feasibility of real-time monitoring of UKC in the SOMS. This was presented at the TTEG (Tripartite Technical Experts Group) Meeting in Bali in 2013. The study showed DUKC® offers ship owners/operators considerable productivity and safety benefits over the current 3.5 metre static UKC rule, through these waters, particularly for the VLCCs.

A further development is that OMC has now been awarded by MPA, the next stage of the study on behalf of the Tripartite Body, which is to undertake a testbed assessing the feasibility of communicating real-time UKC information over AIS, for traffic through the Malacca Straits. This was one of the steps recommended from OMC's 2013 study in progressing real-time UKC monitoring through the SOMS. The project will include implementation of an operational DUKC® system as well as measurements on ships, and OMC will present these results at the next TTEG meeting in Bali in 2016.

DUKC® Series 5 roll-out

Meanwhile, the successful roll-out of OMC's latest web-based DUKC® Series 5 technology has continued, with Rio Tinto signing off in October 2015 for updated Series 5 systems to be installed at the ports of Dampier and Cape Lambert. DUKC® Series 5 has also been installed in Torres Strait (AMSA, 2011), Port Hedland (2013), Fremantle (2014), Montreal-St Lawrence River (2014), Napier (2015), Newcastle (2015), Arrium, Spencer Gulf (2015) and Geelong (2015).

Series 5 systems offer our clients convenient and secure access to DUKC® via the web. There is also enhanced safety and risk mitigation through full integration of DUKC® into electronic charting packages, providing clear "go" or "no go" areas. The chart overlay display provides a two-dimensional view of UKC limitations, either on board or via the web interface, significantly improving risk control measures and management of siltation and isolated shoals. Also, the incorporation of met-ocean wave forecasting out to seven days, into the DUKC® calculations provides more accurate and longer range DUKC® tidal windows and drafts forecasts.

On 6 May 2015, at an awards ceremony dinner in London, OMC was named Runner-Up in the 2015 Seatrade 'Innovation in Ship Operations' Award for its web-based DUKC® Series 5 system.

A new direction

The DUKC® Series 5 installation for Arrium Limited (an Australian iron ore exporter and steel maker previously known as OneSteel) marks a new direction for OMC because this is the first time that DUKC® technology is being used for a transshipment operation. Transshipment brings unique challenges because the loading cycle is longer. This Arrium Whyalla DUKC® real-time software navigation system will help enhance Arrium's operations by safely maximising the drafts of ocean-going iron ore carriers, above the existing limit of 18.2 metres, down the Spencer Gulf from a transshipment

point.

In its September 2015 'Saltbush to Steel' newsletter published on its website, Arrium writes that: "The introduction of the DUKC® system could see some vessels potentially load an additional 3,000 wet metric tonnes of iron ore, without any change to sailing path or our operations. This adds a

significant level of safety management to our operations, as well as leading to direct savings

through efficiency of transshipping and freight cost reductions of over \$1 million in the first year."

Berth Warning systems

During 2015, further advances were made with OMC's predictive and real-time Berth Warning System, which is a practical tool for ensuring the safe mooring of ships. The BWS system at Botany Bay was upgraded during the year to the latest version. BWS systems have also been implemented at Cape Cuvier, Dampier and Cape Lambert but they are not yet operational. Meanwhile, a BWS system at Hay Point has been operational for more than 15 years.

The BWS helps to support terminal operators to make decisions about the operating safety of berthed ships based on measured and forecast conditions. This provides a scientific tool for reducing the probability of an incident resulting from excessive motions of the moored ships. It is also a planning tool for ship berthings, improving such decisions as to whether to remove a berthed ship, delay berthing, increase loading rates or to simply operate as scheduled.

Safety is top priority

For OMC's more than 40 maritime and software engineers – working under the direction of our CEO Peter O'Brien - the future is very exciting as we continue to 'push the envelope' with our research and development and innovations, with safety always our number one priority. ▲

Editors Note:

Following from his admission to the Australian Maritime Hall of Fame in 2014, Dr Terry O'Brien was appointed a member of the Order of Australia in the Queen's Birthday Honours List June 2015.

Shipping Australia congratulates Terry for this achievement which recognises his significant service to maritime engineering, to the development to innovative marine navigation equipment and to education.