



Melbourne adopts DUKC

A unique system bringing safety to vessels arriving in some of the largest bulk, container and multi-cargo ports in the world including the Pilbara iron ore ports in North Western Australia has now been licensed to the Port of Melbourne. WPD reports...

Melbourne Maritime engineering firm OMC International has licensed its world leading navigation technology to the Port of Melbourne Corporation (PoMC) in Australia to help ensure the safety of large vessels entering Port Phillip Heads, one of the most challenging waters for ship navigation to be found anywhere on earth. All 35 Port Phillip Sea Pilots have been equipped with OMC's Dynamic Under Keel Clearance (DUKC) technology, installed on portable pilot units to help them safely optimise their vessel's speed and maneuverability. The pilot units receive and process live up-to-the-second DUKC data while in transit through the Heads, across Port Phillip Bay and along the Yarra River. This information enables a pilot to monitor that the vessel's speed is consistent with the predicted safe DUKC passage plan and adjust speed as required. OMC's founder, Executive Director and former Melbourne University academic, Dr Terry O'Brien said licensing the full complement of DUKC navigation software to the Port of Melbourne will minimise the risk of large vessels grounding in these challenging waters. OMC has configured accurate and valid algorithms which can safely manage underwater keel clearance in all conditions. This includes long swells up to five meters significant wave height interacting with currents up to six knots on the ebb which, in such extreme conditions, cause even large ships to plunge downwards several meters. "The combination of heavy swells, strong currents, complicated bathymetry and hard bottom makes the restricted entrance

into Port Phillip Bay one of the most difficult pilotage challenges – and technical challenges for UKC prediction – anywhere on earth," explains O'Brien. "Having the safety of our system proven in these extreme waters shows that DUKC technology is suitable for even the most challenging waterways worldwide."

Paradigm shift

Melbourne is Australia's largest and one of the world's top 50 container ports. OMC's technology is now installed in most major Australian ports and also overseas. "DUKC has caused a paradigm shift in Under Keel Clearance management, from Static rules to Dynamic analyses of UKC requirements," O'Brien said. In the past 16 years, it has provided billions of dollars in economic benefits to ports and port users worldwide, and helped prevent ship groundings and environmental disasters. Dr O'Brien said that DUKC technology is the only system in the world that has a proven capacity to analyse the critical vertical component of navigation (what you can't see under the water) during the actual transit, where one centimeter of extra under keel clearance could mean 130 tonnes of extra cargo or, if you get it wrong, a touch-bottom incident! Established in 1987, OMC International is a maritime engineering company based in Melbourne. With a strong research focus, OMC specialises in ship motion analysis, Under Keel Clearance (UKC) systems and channel design. It continues to develop and refine computer-based programs to maximise the cargo carrying capacity of large vessels while ensuring safe navigation through shallow, depth-restricted waterways. "OMC has attracted substantial R&D funding during the last decade and will continue to operate as an innovative enterprise offering cost effective, value adding products for safer ship navigation through shallow waterways," he said.

What is DUKC?

It is a unique and sophisticated maritime engineering system which uses data such as waves, tides, currents and vessel dynamics to calculate in real time the safest and most efficient transit of large ships in and out of ports and through shallow, depth restricted waterways. Ships normally rely on a fixed, and therefore necessarily conservative, allowance for room required under the ship to navigate narrow passages. DUKC works by calculating all variables, such as wind, currents, tides, size of the ship, to work out exactly how much room that ship, with that cargo, on that day, has to move without touching the bottom. DUKC combines static information (like mapping of the ocean floor) with dynamic information (like tides and swells). By calculating these factors, it is able to reliably predict how deep and how fast large ships can go through the water without the risk of running aground. The DUKC system can be installed by the port, (Standard DUKC Desktop), be integrated into its navigation assistance VTS (Vessel Traffic Systems) tower which relays information to the ship's pilots (DUKCVTS), or it can be installed on laptops (Portable Pilot Units DUKC PPU) which pilots take on board so that they have live up-to-the-second readings that allow them to safely optimise their speed and give themselves even more room to move, without any risk of grounding. The first DUKC system was installed in 1993 in Queensland's Hay Point coal terminal, with the support of Ports Corporation Queensland (PCQ), and since then this technology has provided nearly USD 10 billion in economic benefits to ports and port users worldwide, without any touch-bottom incidents. In the past 16 years, there have been more than 45,000 safe sailings around the world under DUKC advice. Safety is paramount to these ports as they are often adjacent to capital cities. DUKC helps guide ships also through the Great Barrier Reef, one of the seven natural wonders of the world. This proven DUKC advice is important because the ecological consequences of a ship running around here, or anywhere, are clear. Additional environmental benefits include reduction in carbon emissions from fewer overall sailings for the same tonnage and reduced risk of ship grounding. The technology also has proven safety benefits. Attracting Australian and international media attention in August 2008 was a request by Port Hedland Port Authority (PHPA) for OMC's technical help in refloating a large bulk carrier, the 'Iron King' that ran aground on the side of the shipping channel in Port Hedland, Western Australia due to a steering malfunction. (See article in December 2008 issue – page 27.)