

technology

Under-keel under control

Reducing the risk of grounding can also improve productivity

Being able to accurately predict under-keel clearance for a large bulker, container ship or tanker transiting a shallow tidally restricted waterway not only makes for safer and more efficient navigation, it also makes commercial sense. For the port operator, the sailing draught can be increased and the tidal window extended, improving productivity at a fraction of the cost of dredging; for the ship operator those benefits translate into more cargo loaded on the vessel and greater flexibility in the timing of port calls.

Almost all of the iron ore and most of the coal exported from Australia is shipped out under advice provided by OMC International's Dynamic Under Keel Clearance (DUKC) manage-

ment system, of which the web-based Series 5 has recently been launched. Key to the system is the numerical ship motion model that enables calculation and forecasting of the interaction of waves, tides, currents and vessel dynamics in real time.

The port-based system enables long-term planning of maximum safe draught and earliest and latest sailing times, which is then refined from 48 hours ahead of transit time right up to the time of sailing.

When the vessel is loaded and the pilot embarks, s/he accesses DUKC by laptop and is able to use it to optimise safe vessel speed and to receive advice on any unexpected circumstances, such as vessel breakdown. The VTS tower monitors the passage, tracking the ship's vertical as well as horizontal movements.

Peter O'Brien, OMC's CEO, emphasised DUKC's importance as a risk management tool – as



DUKC on portable pilot unit
[Photo: OMC International]

evidenced by its selection by the Australian Maritime Safety Authority (AMSA) for the environmentally sensitive Torres Strait. Installing DUKC, which will be compulsory for all deep draught vessels, will enable AMSA to validate the existing safety margin for such ships and evaluate the appropriateness of the current draught regime. There

is also potential for efficiency benefits, O'Brien pointed out, as the Torres Strait is a busy channel for international shipping and currently a serious bottleneck. The system is due to come into operation early next year.

Further benefits for port and ship operators are likely to come from work OMC is undertaking for Port Hedland Port Authority. In June 2009 the port set a record of five bulk carriers loaded with iron ore sailing on one tide (a window of two to three hours) and would like to replicate this as growth is planned. At the moment, the average is two to three ships on a tide. OMC has been commissioned to develop and install a DUKC Optimiser program to maximise throughput over a tide cycle.

This will involve looking at the whole cycle, rather than at individual ships in isolation, and the constraints (eg tug times, separation distance between vessels and pilot availability) in order to optimise sailing times and draughts. Stage one is expected to be released in September. ■

Benefits directly attributed to DUKC*

Port Hedland, Western Australia

Commissioned:	1995
Exports:	over 110M tonnes iron ore/year
Additional tonnes/year loaded:	5M
Average increase in max draught:	65cm
Additional vessels sailing/year:	50
Increased value annual export earnings:	\$200M

Port of Dampier, Western Australia

Commissioned:	1995
Exports:	over 110M tonnes iron ore/year
Average increase in max draught:	40cm
Widening of tidal windows:	significant, particularly during neap tides
Increased value annual export earnings:	\$130M

Port of Hay Point, Queensland

Commissioned:	1993
Exports:	85M tonnes coal/year
Additional tonnes/year loaded:	3M
Typical increases in draught:	50cm-1.1m (depending on tidal residuals and wave conditions)
Increased value annual export earnings:	\$180M

*As determined and advertised by the individual ports

[Source: OMC International]