

Cautionary Notes**Charts and Tide Predictions**

1. It is increasingly common for mariners to navigate in shallow water with a bare minimum depth below the keel (under-keel clearance). This minimum depth below the keel is usually assessed from the charted depths and predicted tide levels. Given this the mariner should note the following:

- (a) Due to the technical limitations of hydrographic surveys and the uncertainties in tidal reductions for surveys, nautical charts can seldom be absolutely reliable in their representation of depth. Other limitations of hydrographic surveys are discussed at length in the *Admiralty* publication, *The Mariner's Handbook (NP 100)*.
- (b) The mariner should be aware that any chart, regardless of age of survey, may not show all seabed obstructions or the shoalest depths.
- (c) Depths can change quickly in areas where the seabed is highly dynamic. These critical areas are surveyed more frequently but significant changes can occur in between surveys. In all cases the mariner should contact the local authority for the latest survey and depth information.
- (d) Tidal levels, and therefore the least depth over seabed obstructions, are affected by meteorological conditions, i.e. barometric pressure, wind, swell, and both positive and negative storm surges. These are described on pages 27-28 of the "Tidal Section", *New Zealand Nautical Almanac (NZ 204)* and the *Admiralty Tide Tables*. As a result, actual tide levels may vary appreciably from predicted values.
- (e) Where an expected least depth or an under-keel clearance is determined using only tidal predictions and charted depths the uncertainty in the survey and tidal predictions may be compounded.

Waves Caused by Meteorological Conditions

2. Mariners are warned that in addition to local swell waves, certain meteorological conditions may generate swell waves which can significantly reduce a vessel's under-keel clearance in the approaches to some New Zealand ports. These swell waves may be generated from any or all of the following:

- (a) long period swell waves with amplitudes up to 0.5 metre and periods up to 20 minutes;
- (b) infra-gravity waves (waves generated by the interaction between swell waves) with amplitudes up to 1.5m and a period of several minutes;
- (c) rissaga (meteorological tsunami) generated by fast moving atmospheric pressure systems.

The generation of such swell waves is particularly likely when a deep depression situated to the east of New Zealand is moving quickly towards the south-east. Ports on the east coast of New Zealand which are exposed to swell from south through to east are particularly susceptible to swell effects.

Mariners should navigate large vessels with caution under swell conditions. The prudent mariner will allow for navigational uncertainties by preserving adequate clearance, both horizontally and vertically.

New Zealand locations where long period swell, infra-gravity waves and rissaga may be experienced:

- Approaches to Port Taranaki
- Approaches to Whangarei Harbour
- Approaches to Gisborne
- Approaches to Napier
- Approaches to Wellington
- Approaches to Lyttelton
- Approaches to Timaru
- Approaches to Otago Harbour
- Foveaux Strait.

Dynamic Under-Keel Clearance Systems

3. Dynamic Under-Keel Clearance (DUKC) systems generate predictive information regarding a particular vessel's under keel clearance in the expected weather, tidal and sea conditions. The pilot provides this information from the DUKC system to the ship's master.

DUKC systems are in operation at the following New Zealand ports:

- Port Taranaki
- Marsden Point / Whangarei Harbour
- Napier