Document title	Draft Guidelines on Under Keel Clearance
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Agenda Item	4 – Draft Recommendation on Under Keel Clearance
Submission date	28.10.2014
Submitted by	Finland
Reference	Outcome of SAFE NAV 4-2014, Paragraphs 3.16-3.21

Background

HELCOM SAFE NAV 4-2014 agreed to establish a Correspondence Group (CG) to develop regional Baltic Sea recommendations for Under Keel Clearance under the lead of Finland, with the aim to have a first draft by 1 April 2014 and a new draft for HELCOM SAFE NAV in December 2014. The attached draft UKC Guidelines, developed intersessionally, has been circulated by Finland to the CG in October 2014, and comments by the CG are requested to be provided by 3 November 2014.

Action required

The Meeting is invited to consider and amend the draft for a new HELCOM Recommendation on Under Keel Clearance in the Baltic Sea region, taking into account that a revised draft will be submitted to SAFE NAV 5-2014 after comments received by the deadline of 3 November 2014.

[DRAFT] GUIDELINES [FOR MARINERS] ON DETERMINATION OF SHIP'S SAFE UNDER KEEL CLEARANCE

1. Introduction [Scope and purpose]

These Guidelines are intended to provide basic guidance on determination of ship's minimum under keel clearance (UKC) to provide safe navigation through the areas with restricted available depth of water and thus enhancing safety of shipping and protection of environment.

The purpose of these Guidelines is to provide Contracting Governments, masters, navigating officers and Companies (particularly in connection with the ISM Code and procedures arising therefrom) with a framework enabling them to respond effectively to ensure that ship maintains sufficient UKC and safe draught during its whole intended voyage. These Guidelines are primarily applicable for the open seas, as well as transit routes in connection with IMO routing measures in the Baltic Sea, but also cover other parts of the Baltic Sea and coastal waters as appropriate.

Nothing in these Guidelines shall prejudice the rights of masters to act accordingly in the distress and emergency situations or any other extenuating circumstances in order to ensure the safety of life at sea, safety of the ship and protection of the environment.

These Guidelines are without prejudice to the rights and obligations of coastal and port States to exercise their powers under existing international conventions.

2. [General guidance]

The master is responsible for estimating the minimum UKC during the whole voyage from berth to berth, including those areas where the services of a pilot will be used.

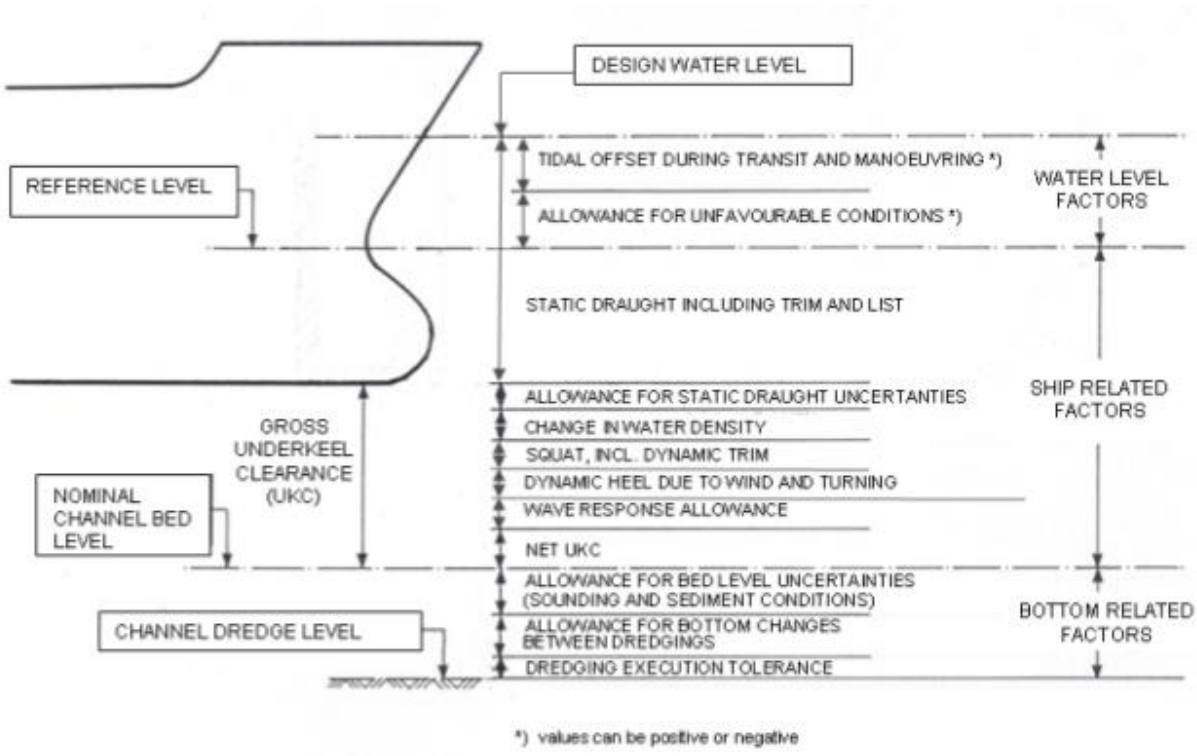
To assist the master with this requirement, the ship's Company should provide the master with written UKC guidance. Ship's draught, controlling depth of the port, and the impact of weather and other environmental conditions such as sea conditions and vessel traffic should be addressed in written guidance. If conditions which mandate when the Company should be contacted are not prescribed in writing, the guidance should provide the master with direct authority to delay the transit or take any action necessary to ensure the ship's safe navigation.

The master should review the passage plan using the Company's written guidance and estimate the anticipated UKC. The master and the relevant pilot should discuss and agree the transit plan including the anticipated UKC.

3. Under keel clearance [detailed factors]

Under keel clearance consists of three factors:

- Water level factors. These include the reference water level and tidal and meteorological effects, which can be positive or negative.
- Ship related factors. These include static draught of the ship and the Gross UKC. The draught can vary during the passage of the vessel (i.e. depending on fuel and stores consumption, ballast adjustments, etc.). The Gross UKC is composed of six factors; allowance for static draught uncertainties, change in water density, ship squat and dynamic trim, dynamic heel, wave response allowance and the Net UKC.
- Bottom related factors. These include allowance for bed level uncertainties, allowance for bottom changes between dredging and dredging execution tolerance.



4. Calculating under keel clearance

The determination of UKC should be done as part of the detailed voyage plan, as is described in IMO Resolution A.893(21). The determination starts with general overview of the intended route or track of the voyage on appropriate scale charts in order to find out the areas with restricted water depth.

Detailed UKC calculations should be made to all areas with restricted depth. These calculations should be made for certain time, according to the passage plan. Calculations should take into consideration the characteristics of the area; port, confined waters, open coastal water and ocean passages.

Calculations should ensure safe conduct of the ship during transits bearing in mind ship's steering ability, maneuvering characteristics, speed, and any other operational constraints that may be applicable due to the ship's UKC.

Following factors should be taken into consideration when estimating sufficient water depth:

- The maximum draught of the ship. If the ship does not have an even-keel draught, the maximum draught at the bow or stern should be used. Also possible list should be taken into consideration.
- Chart Datum
- Tide at the calculated time for passing the area
- Weather at the calculated time for passing the area
- Squat at planned speed
- Characteristics of the sea bed
- Current
- Waves
- Effect of possible icing on draught of the ship
- Local navigational warnings
- Water density
- Ice conditions

Sea depth should be estimated as the depth as charted on the navigational chart and corrected according to a correction value. The correction value should be determined according to the tide calculations (on tidal waters) or changes to the Mean Sea Level (areas with no tides). The relevant data should be obtained through common channels of information to mariners and local warnings i.e.: any pertinent information found in the Coast Pilot or Local Notice to Mariners and Navigational and Hydro-meteorological Warnings.

Effect of squat. Squat is a steady downward displacement consisting of translation and rotation due to the flow of water past the moving hull. Prediction of ship squat depends on ship characteristics and channel configurations.

The speed of a ship through water is of great importance when evaluating the effects of squat. Squat is approximately proportional to the square of the ship's speed through the water, hence halving the speed reduces the squat effect only by a factor of four.

When calculating the effect of squat care should be taken as regards the minimum maneuverable speed and the ship's ability to perform the maneuvers intended by the pilot/master without the assistance of tugs. The ability of a ship to maneuver at its design speed will decrease when the clearance between the channel bottom and the ship's keel is reduced and may become insufficient if it is less than a certain critical value that maintains sufficient flow under and around the ship.

Pilotage. The ship's draught, controlling depth of the port transit, and the anticipated UKC should be discussed with the ship's pilot. UKC calculations should be presented to the pilot along with the passage

plan. Transits through shallow areas are to be discussed in detail with reference to dynamic UKC. Appropriate logbook entries should be made regarding this discussion. The pilot should be consulted for any additional information that may affect the controlling depth of the port transit.

5. Simplified UKC assessment [and recommendations]

In port

When navigating within a port or secured to a berth, it is recommended that UKC is never less than 1,5 % of the ship's breadth, and at the minimum 30cm. In case a UKC cannot be maintained and if extenuating circumstances do not apply, the master should advise and consult with the Company to seek further guidance.

At sea

Except in extenuating circumstances:

- In confined waters and approaches to ports, a minimum Net UKC of 8% of the draught should be maintained;
- In open coastal waters, a minimum Net UKC of 15% of the draught should be maintained.

Local requirements

Where a Contracting Government, port authority, or pilot organization establishes a mandatory or recommended minimum UKC, the master should ensure that, as a minimum, such UKC is maintained after taking into account the factors listed above.

6. Responsibilities

Master

• Ensuring that the ship maintains sufficient UKC within the limits set in the Company's procedures.

• Taking into account local governmental, port authority or pilot organization's regulations and charterer's instructions requiring UKC that differs from those stipulated in these Guidelines.

• Ensuring awareness of the Company's UKC policy and its compliance amongst navigating officers while preparing passage plans.

• Informing the Company when these procedures cannot be complied with or when the master considers UKC to be unsafe; in such cases, initiating mitigating measures.

Navigating Officers

• Being aware of the UKC requirements and constraints thereof at all times while navigating a ship.

• Being aware of the master's UKC requirements.

• Making provisions for the required minimum UKC while preparing a passage plan.

Company

• Setting and reviewing UKC limitations.

• If deemed necessary, setting guidelines and draught limitations for transit to certain ports or areas to ensure the safety of its ships.

7. Extenuating circumstances

If voyage orders specify a draught or cargo nomination that will result in a lesser UKC than that stipulated above, the master should notify the Company. Provided there are reasonable local regulations, rules or recommendations by relevant authorities, which endorse such voyage orders/nominations, the master should exercise due diligence and, in consultation with the Company, may comply with such voyage orders and/or nominations.

Consideration should be given to the possible applicability of the below given conditions in reaching such decision:

- The ship is in calm sheltered waters, speed is controlled at which the effect of squat is minimal, and the draught of the ship as well as the water depth can be verified accurately.
- The ship is crossing lock or dock sills.
- Ships of similar build, size, draught and speed have already established the safety of the transit under prevailing environmental conditions.