**NIPWG xx-xx**

## Paper for Consideration by NIPWG

## GI-registry definitions of concepts related to Under Keel Clearance (UKC)

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| ***Submitted by:*** | NIPWG |
| ***Executive Summary:*** | Summary of the ongoing discussion regarding GI-register definitions related to Under Keel Clearance (UKC) |
| ***Related Documents:*** | NIPWG-VTC03-05B |
| ***Related Projects:*** | S-131, S-129, S-127, GI-registry, S-32 |

## Introduction / Background

This paper is a summary of intersessional discussions related to the Under Keel Clearance (UKC) - concepts. The discussion commenced after VTC03 in late 2022, based on a schematic image based on the current UKC- definitions that was presented to the meeting. The schematic was primarily based on definitions added to the GI-register in 2020 and 2021.

The discussion has revealed regional differences in the use, simplification and interpretation of some of the UKC-related concepts. Additionally, different views on the adoption of fairway design concepts in operational use were identified. This is also reflected by the fact that some of the definitions in GI-register seem to have been amended "back and forth" during 2021 and 2022.

## Analysis/Discussion

Under Keel Clearance (UKC) is a broad concept, widely used across the full maritime domain. Although UKC as a concept is briefly touched within several S-100 product specifications (PS), there is no current PS containing a very detailed use of UKC. S-127 contains features merely indicating the extent of areas with UKC related restrictions. S-129 contains features indicating safe and unsafe areas related to a UKC- calculation that is external to the PS itself.

Within the discussions, especially the definition of Gross UKC was found to have different interpretations, and is used as an example in this paper. It should anyway be noted, that all UKC- concepts are interlinked and have internally defined relations. In order to support the machine readability required by S-129 related Dynamic UKC systems (DUKC) and e-Navigation solutions, UKC- concepts should also be mathematically sound and explicitly defined.

In 2021 the Hydrographic Dictionary Working Group (HDWG), initially submitted the new term "Gross Under keel clearance" with definition; *"The Under Keel Clearance including all margins to cater for uncertainties of observed ship draught and ship movement."* The justification of the initial definition reveals the broad scope and many use cases related to UKC; "*Best use of existing definitions from PIANC, IHO and Industry. Mix of inputs from PIANC, IHO WG S-129, NP100, International Harbour Master Association (IHMA), and International Taskforce Port Call Optimization (ITPCO, ports and shipping together)".*

The initial definition seem to be the result of a quite extensive discussion and consensus among stakeholders. In early 2022 an amendment was made, where *"observed depth accuracy"* was added; *"The Under Keel Clearance including all margins for observed depth accuracy, ship draught accuracy and ship movement."* Within the GI-registry, the addition was valid only 4 months, as later in 2022 the definition was again amended, based on a clarification request from S-129 PT. The current definition since 07/2022 is;

*"The Under Keel Clearance allowing for a vessel’s static draught only".*

With only textual descriptions within the GI-registry, the intended use and correct interpretation of the definitions in different situations is not straightforward.

## Conclusions

There are several "industry standards" related to UKC, as indicated in the original GI-registry justification. The current discussion has identified different use of terms especially related to Design vs. Operational concepts, but also Regional and Cultural differences in application are noted. Additionally, use of depths on nautical charts, and associated margins in relation to current GI- definitions raised some questions.

From a mariners point of view "industry standards" are considered the concepts described in mariners handbooks, nautical charts (S-4) and related port handbooks. Even though onboard personnel generally might not be familiar with the design concepts, mainly adopted from PIANC, these are also widely adopted in certain areas like the Baltic Sea, and worldwide by some operational user groups, such as pilots. The design concepts also seem to be the concept of choice in many digital operational services such as (S-129 related) UKC- management systems.

## Recommendations

The need to further clarify operational- and design concepts was identified. Current use of concepts and the ongoing development of new digital products and services seem to bring design concepts also into the operational context, and we must assume that in a near future also onboard might be facing both. Ideally, operational and design concepts would be harmonized and interchangeable, but at least a distinction of terms by renaming or prefixing is needed.

It was recommended within discussions, that different kinds of operational use-cases should be documented, in order to gain a better understanding of the field that should be supported by GI-registry entries. Within IHO, additional to NIPWG, at least S-129PT should be consulted, as the responsible body for S-129 Underkeel Clearance Management PS.

## Action Required of NIPWG

The NIPWG is invited to:

a. Note this paper and the ongoing discussion

b. Take actions as appropriate