



12th Meeting of the IHO (S-100WG) S-101 Project Team

Covered Structures Over Navigable Water

Agenda Item 06.9



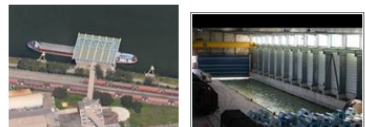
- Email correspondence with Gaël Billet (IEHG) requesting modelling to better encode roofed structures over navigable water.



Hi Jeff,

I am coming back to you regarding your comment in the DDR for the enumeration values `roffAboveNavigableWater` and `buildingAboveNavigableWater`. You have made it directly in the proposal and I have replied but I am not sure if you are receiving or not a notification when a comment is added.

As mentioned in the comment, we agree with you that function is not the correct attribute to bind these two values. But on the other hand, many of the roofs and buildings are also not real "obstructions" (Definition: In marine navigation, anything that hinders or prevents movement, particularly anything that endangers or prevents passage of a vessel. The term is usually used to refer to an isolated danger to navigation, such as a sunken rock or pinnacle.). A roof that prevents a transshipment site for bulk cargo from rain or a hall for the protected transshipment of sensitive cargo are no obstructions, but buildings for navigation.



Another example is a restaurant that is extending above navigable water. But a berth for



We are thinking of proposing the introduction of a concept for a new simple attribute in can be bounded to features such as Building. A second step could be to introduce a new

If you agree on the principle, we will work on these proposals to submit them.

Thank you in advance for your reply,
Best regards,
Gaël



Hi Gaël,

Thanks for reminding me of this. I had seen your comments but had forgotten to respond - my apologies.

There is a character limit for comments in the Registry interface that I reached when responding to your comments. I repeat these comments below but complete my thinking. In a nutshell I believe that there is scope here for developing a new feature that could be utilised for both S-101 and S-401, so suggest any consultation within the IEHG should also involve the S-101PT.

My rationale for considering these as an obstruction is that if the vessel dimensions exceed any of the vertical or horizontal clearance restrictions for the structure over the water then (not to mention the existence of any supporting infrastructure such as stanchions or pylons) the structure is definitely an obstruction for that vessel in what would be considered otherwise navigable water.

However, thinking about this in regard to your comments, I think the best option moving forward, taking the example of the modelling of a separate feature class for bridges, would be to consider a new feature class such as `StructureOverNavigableWater`, which could, for example, contain an attribute `categoryOfStructure` to further define the type/purpose of the structure. The other attributes for this feature could be based on the attributes for the `Bridge` feature (vertical and horizontal clearance, height and length, colour, natureOfConstruction, visualProminence, radarConspicuous, ...) + maximumPermittedDraught, minimum depth, and possibly an indication of the intended vessel type. The categoryOfStructure could contain values such as `boathouse`, `coveredBerth`, `maintenanceShed` etc. My thinking on this is also informed by the requirement for ECDIS functionality/performance (display category, viewing group, alarms and indications, ...) which I think would be simplified by the inclusion of a new feature class rather than trying to extend an existing class. Consideration also needs to be given to introducing new attribution to an existing feature class that are unique to a relatively uncommon real-world circumstance for a relatively generic concept (such as building). Recent discussions in the S-101PT resulted in the removal of mooring buoy as a value for the attribute `categoryOfMooringWarpingFacility` as this required the inclusion of the attribute `buoyShape` on the feature `MooringWarpingFacility` which is only required if the feature is a mooring buoy - it has been decided that mooring buoy will be re-modelled as its own feature class.

I have also taken into account the guidance for the compilation of nautical Charts that has been included in S-4 - B-321.9, related to the representation of covered berths, in developing this modelling alternative.

As stated in the above comment, I think this would be the best option moving forward and would be happy to work with you on the modelling with the intention, if you are in agreement, of making a proposal (I will also be happy to collaborate on this) to the S-101PT11 meeting in late September for inclusion in Edition 1.2.0 of S-101 for implementation and testing.

I am currently working through my S-101 DCEG actions from the S-101PT10 meeting in June and would be happy to put together some "straw man" modelling in the DCEG feature Table format that could form the basis for a proposal to both the IEHG and S-101PT. I think this would best serve both inland and "open water" navigation. What do you think?

Best Regards,
Jeff.

Current S-101 encoding guidance:

- For covered boathouses and other buildings that are located in or partially overlap the navigable water area, any associated features should be encoded as they exist in the "real world"; for example jetties as **Shoreline Construction**, pontoons as **Pontoon**, mooring posts as **Mooring/Warping Facility**. The roofed area may be covered by a **Building** feature of type `surface`, with attribute `function = 47` (boathouse). If the service being provided by the structure is known, features **Small Craft Facility** (see clause 22.8) or **Harbour Facility** (see clause 22.7) may also be encoded.
- For buildings located in or over navigable water, the Boolean attribute `in the water` must be set to `True` to indicate that the feature is to be included in the ECDIS Base Display. Where such structures are located over the water it is not required to encode any supporting structures (for example piles, stilts).

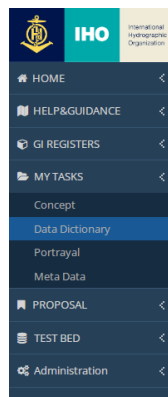


IHO THE PROPOSAL

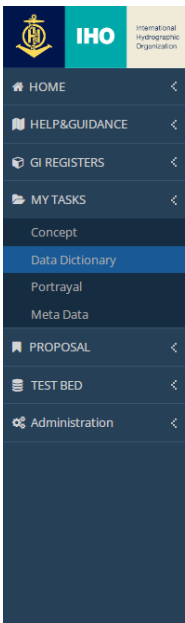
International Hydrographic Organization

• Original proposal from IEHG for 2 new enumerate values for attribute function:

- roofAboveNavigableWater
- buildingAboveNavigableWater



[Enumeration Value] Dictionary Details					
Domain	Inland ENC				
Name	Building Above Navigable Water				
CamelCase	buildingAboveNavigableWater				
Definition	The part of a building on land that is extending above navigable water. Depending on the vertical clearance vessels can pass under the building above navigable water.				
Reference					
Remarks					
INT1	<input type="text"/>				
S4	<input type="text"/>				
Data type	Enumerated value				
Associated Attribute	<table border="1"> <thead> <tr> <th>Attribute type</th> <th>Name</th> </tr> </thead> <tbody> <tr> <td>Enumerated type</td> <td>Function (Valid)</td> </tr> </tbody> </table>	Attribute type	Name	Enumerated type	Function (Valid)
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Management Details			
Proposal Type	Addition	Submitting Org	IENC
Successor	--	Date Proposed	2023-06-05
Predecessor	--	Date Accepted	
Proposed Change	Add a new enumeration value		
Justification	There are several examples of roofs and buildings over the navigable waterway. It is important to be able to encode such a construction accurately.		

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THE PROPOSAL (2)

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- **Response from Registry Manager:**

My rationale for considering these as an obstruction is that if the vessel dimensions exceed any of the vertical or horizontal clearance restrictions for the structure over the water then (not to mention the existence of any supporting infrastructure such as stanchions or pylons) the structure is definitely an obstruction for that vessel in what would be considered otherwise navigable water.

However, thinking about this in regard to your comments, I think the best option moving forward, taking the example of the modelling of a separate feature class for bridges, would be to consider a new feature class such as `StructureOverNavigableWater`, which could, for example, contain an attribute `categoryOfStructure` to further define the type/purpose of the structure. The other attributes for this feature could be based on the attributes for the `Bridge` feature (vertical and horizontal clearance, height and length, colour, `natureOfConstruction`, `visualProminence`, `radarConspicuous`, ...) + `maximumPermittedDraught`, minimum depth, and possibly an indication of the intended vessel type. The `categoryOfStructure` could contain values such as `boathouse`, `coveredBerth`, `maintenanceShed` etc. My thinking on this is also informed by the requirement for ECDIS functionality/performance (display category, viewing group, alarms and indications, ...) which I think would be simplified by the inclusion of a new feature class rather than trying to extend an existing class. Consideration also needs to be given to introducing new attribution to an existing feature class that are unique to a relatively uncommon real-world circumstance for a relatively generic concept (such as building). Recent discussions in the S-101PT resulted in the removal of mooring buoy as a value for the attribute `categoryOfMooringWarpingFacility` as this required the inclusion of the attribute `buoyShape` on the feature `MooringWarpingFacility` which is only required if the feature is a mooring buoy - it has been decided that mooring buoy will be re-modelled as its own feature class.

I have also taken into account the guidance for the compilation of nautical Charts that has been included in S-4 - B-321.9, related to the representation of covered berths, in developing this modelling alternative.

- IEHG, on consultation, have agreed in principle with this proposal.



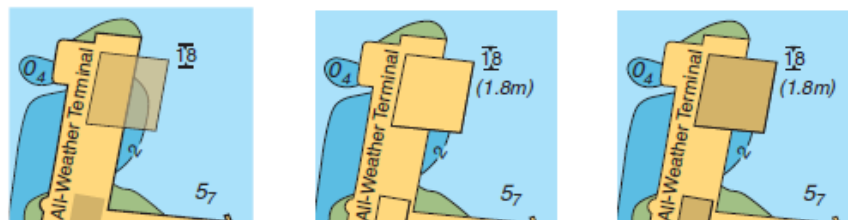
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THE PROPOSAL (3)

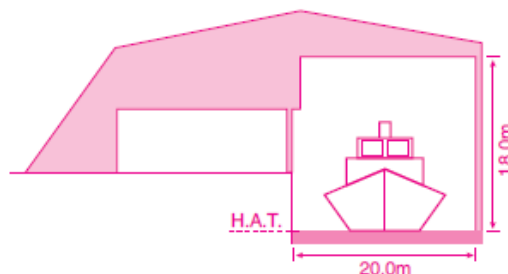
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- Relevant S-4 specification:

B-321.9 A covered berth should be labelled by an appropriate descriptive legend or name, for example: ‘Covered wharf’; ‘Hull All-Weather Terminal’. Transparent urban tint (see B-370.4), representing the roof, may be inserted over the charted hydrography so that any shallow water tint shows through. The urban tint should be surrounded by a black line, finer than coastline. If a transparent urban tint is not possible, then the building should be charted in accordance with national practice for buildings (D1) with land tint and/or solid urban tint, associated legend and clearance height. If required, the depth of water at the berth should also be shown in parenthesis, for example (1.8m). A vertical clearance (see B-380.1-2) should be shown, if known. Examples:



A profile diagram may be included if considered useful (see B-390).





IHO THE PROPOSAL (4)

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- Proposed new feature StructureOverNavigableWater:

8.X Structure Over Navigable Water

IHO Definition: STRUCTURE OVER NAVIGABLE WATER. A roofed structure erected, or partly erected, over a body of water, to provide protection for a vessel or its cargo.				
S-101 Geo Feature: Structure Over Navigable Water				
Primitives: Surface				
Real World	Paper Chart Symbol	ECDIS Symbol		
S-101 Attribute	S-57 Acronym	Allowable Encoding Value	Type	Multiplicity
category of structure		1_ boathouse 2_ covered bulk terminal 3_ covered wharf 4_ covered service terminal 5_ covered passenger terminal	EN	0..*
colour	(COLOUR)	1_ white 2_ black 3_ red 4_ green 5_ blue 6_ yellow 7_ grey 8_ brown 9_ amber 10_ violet 11_ orange 12_ magenta 13_ pink	EN	0..*(ordered)
colour pattern	(COLPAT)	1_ horizontal stripes 2_ vertical stripes 3_ diagonal stripes 4_ squared 5_ stripes (direction unknown) 6_ border stripe	EN	0..*
condition	(CONDITN)	1_ under construction 2_ ruined 3_ planned construction	EN	0..1
feature name			C	0..*
display name			(S) BO	0..1
language		ISO 639-2/T	(S) TE	0..1
name	(OBJNAM) (NOBJNM)		(S) TE	1..1
fixed date range		See clause 2.4.8	C	0..1
date end	(DATEND)		(S) TD	0..*

date start	(DATSTA)		(S) TD	0..*
height	(HEIGHT)		RE	0..1
horizontal clearance fixed			C	1..1
horizontal clearance value	(HORCLR)		(S) RE	1..1
horizontal distance uncertainty	(HORACC)		(S) RE	0..1
horizontal length	(HORLEN)		RE	0..1
horizontal width	(HORWID)		RE	0..1
nature of construction	(NATCON)	1_ masonry 2_ concrete 3_ wooden 4_ metal 5_ glass reinforced plastic 11_ latticed 12_ glass	EN	0..*
periodic date range		See clause 2.4.8	C	0..*
date end	(PEREND)		(S) TD	1..1
date start	(PERSTA)		(S) TD	1..1
product	(PRODDCT)	7_ chemicals 12_ iron ingots 13_ salt 21_ cement 22_ grain 25_ clay	EN	0..1
radar conspicuous	(CONRAD)		BO	0..1
reported date	(SORDAT)	See clause 2.4.8	TD	0..1
status	(STATUS)	1_ permanent 4_ not in use 5_ periodic/intermittent 7_ temporary 8_ private 12_ illuminated 14_ public	EN	0..*
vertical clearance fixed			C	1..1
vertical clearance value	(VERCLR)		(S) RE	1..1
vertical uncertainty			(S) C	0..1
uncertainty fixed	(VERACC)		(S) RE	1..1
uncertainty variable factor			(S) RE	0..1
vertical datum	(VERDAT)	3_ mean sea level 16_ mean high water 17_ mean high water springs 18_ high water 19_ approximate mean sea level 20_ high water springs 21_ mean higher high water 24_ local datum 25_ international great lakes datum 1985	EN	0..1



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THE PROPOSAL (5)

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		<p>26 mean water level</p> <p>28 higher high water large tide</p> <p>29 nearly highest high water</p> <p>30 highest astronomical tide</p> <p>44 Baltic sea chart datum 2000</p>		
vertical length	(VERLEN)		RE	0,1
visual prominence	(CONVIS)	<p>1 visually conspicuous</p> <p>2 not visually conspicuous</p> <p>3 prominent</p>	EN	0,1
scale minimum	(SCAMIN)	See clause 2.5.9	IN	0,1
information		See clause 2.4.6	C	0,1
file locator			(S) TE	0,1
file reference	(TXTDSC) (NXTDSC)		(S) TE	0,1
headline			(S) TE	0,1
language		ISO 639-2/T	(S) TE	0,1
text	(INFORM) (NINFORM)		(S) TE	0,1
pictorial representation	(PICREP)	See clause 2.4.12.2	TE	0,1

Feature Associations

S-101 Role	Association Type	Associated to	Type	Multiplicity
Supports	Structure/Equipment (see clause 25.15)	Daymark, Distance Mark, Fog Signal, Light All Around, Light Fog Detector, Light Sectored, Physical AIS Aid to Navigation, Radar Transponder Beacon, Retroreflector, Signal Station Traffic, Signal Station Warning	Association	0,1
Component of	Aids to Navigation Association (see clause 25.2)	Fairway System, Traffic Separation Scheme, Two-Way Route	Aggregation	0,1
Updates	Updated Information (see clause 25.19)	Update Information	Association	0,1
Positions	Text Association (see clause 25.16)	Text Placement	Association	0,1
Provides Information	Additional Information (see clause 25.1)	Neutral Information	Association	0,1

The sub-attribute **colour pattern** is mandatory for structures over navigable water that have more than one value populated for the sub-attribute **colour**.

For each instance of **fixed date range**, at least one of the sub-attributes **date end** or **date start** must be populated.

For each instance of **information**, at least one of the sub-attributes **file reference** or **text** must be populated.

INT 1 Reference: D 20-24

8.X.1 Structures over navigable water (see S4 – B-321.9)

If it is required to encode a roofed structure that is over or partially extends over navigable water, it must be done using the feature **Structure Over Navigable Water**.

The value of the vertical clearance between (high) water level and any fixed overhead obstruction must always be given, where known, on the largest optimum display scale ENC data intended for navigation under the structure, and for detailed passage planning. The datum above which clearances are given must be a **high water level**, preferably Highest Astronomical Tide (HAT), where the tide is appreciable. For structures over navigable water, the value for the vertical clearance must be encoded using the complex attribute **vertical clearance fixed**, and sub-attributes populated relevant to the feature, rounded down to the nearest whole metre (unless under 10m, when metres and decimetres may be quoted). In areas where the tidal range is not appreciable the datum above which clearances are given should be Mean Sea Level (MSL).

Remarks:

- If it is required to encode the minimum depth for a covered berth or the maximum permitted vessel draught allowed at the berth, this must be done by populating the attributes **minimum berth depth** and **maximum permitted draught**, respectively, for the associated **Berths** feature (see clause 8.13).
- Water under the covering structure must be encoded using the features **Depth Area**, **Dredged Area** or **Unsurveyed Area** (and appropriate **Depth Contour** and **Sounding** features) if the waterway is navigable at the optimum display scale for the ENC data, or using the features **Land Area** if the waterway is not navigable at the optimum display scale for the ENC data.
- The attribute **height** is used, where required, to encode the height of the highest point on the covering structure (see clause 2.5.7).
- The complex attribute **feature name** must only be encoded, if required, where the name of the structure is different to the name of the associated berth.
- In navigable water, roof supporting pylons/stanchions must be encoded, where possible, using a **Pylon/Bridge Support** feature (see clause 6.12), with the mandatory attribute **category of pylon** populated as empty (null).
- If possible, it is strongly recommended that an image or graphic of the structure is included, using the attribute **pictorial representation**.
- If available and considered important for route planning and/or monitoring, the vertical uncertainty associated with encoded vertical clearance values should also be encoded.

Distinction: Berth; Building; Landmark; Shoreline Construction; Small Craft Facility.

27.X category of structure

IHO Definition: **CATEGORY OF STRUCTURE**. Classification of a covered or partially covered area where different use types of vessel can berth.

Attribute Type: Enumeration

1) boathouse

IHO Definition: A building or shed, usually built partly over water, for sheltering a boat or boats.

2) covered bulk terminal

IHO Definition: A covered or partially covered terminal for the handling of bulk materials such as iron ore, coal, etc. (Adapted from S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.38, November 2000).

3) covered wharf

IHO Definition: A covered or partially covered structure serving as a berthing place for vessels. (Adapted from IHO Dictionary – S-32).

4) covered service terminal

IHO Definition: A covered or partially covered terminal within which the floating equipment (dredges, tugs ...) of harbour services are berthed and serviced.

5) covered passenger terminal

IHO Definition: A covered or partially covered terminal for the loading and unloading of passengers. (Adapted from S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.38, November 2000).

Remarks:

- No remarks.



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THE PROPOSAL (6)

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- Other changes to S-101 Annex A if proposal accepted:
 - Clause 2.3 – Add new feature to Table 2-1 (geometric primitives);
 - Clause 2.4.3 – Add new feature to Table 2-3 (mandatory attributes);
 - Clause 2.5.9 – Add new feature to Table 2-7 (scale minimum);
 - Clause 6.2.1 – Add new guidance for feature Building (boathouse) extending over navigable water (reference to new feature);
 - Clause 7.2.1 – Add new guidance for feature Landmark (boathouse) extending over navigable water (reference to new feature);
 - Clause 22.7.1 – Add new guidance for feature Harbour Facility extending over navigable water (reference to new feature);
 - Section 25 – Include new feature in relevant association tables.



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ACTIONS REQUESTED OF S-101PT

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- **Approve** the inclusion of new feature StructureOverNavigableWater for inclusion in S-101 Edition 2.0.0.
- **Initiate** further action as required.



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THANK YOU

S-101PT12 Remote Meeting, 13-15 January 2024