

8.X Structure Over Navigable Water

<u>IHO Definition:</u> 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				
<i>Real World</i>	<i>Paper Chart Symbol</i>	<i>ECDIS Symbol</i>		
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	0,1 †
condition	(CONDTN)	1 : under construction 2 : ruined 5 : planned construction	EN	0,1
feature name			C	0,*
language		ISO 639-2/T	(S) TE	1,1
name	(OBJNAM) (NOBJNM)		(S) TE	1,1
name usage		1 : default name display 2 : alternate name display 3 : no chart display	(S) EN	0,1 †
fixed date range		See clause 2.4.8	C	0,1

date end	(DATEND)		(S) TD	0,1 †
date start	(DATSTA)		(S) TD	0,1 †
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 : concreted 6 : wooden 7 : metal 8 : 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	(PRODCT)	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	EN	0,1

		25 : international great lakes datum 1985 26 : mean water level 28 : higher high water large tide 29 : nearly highest high water 30 : highest astronomical tide 44 : baltic sea chart datum 2000		
vertical length	(VERLEN)		RE	0,1
visual prominence	(CONVIS)	1 : visually conspicuous 2 : not visually conspicuous 3 : prominent	EN	0,1
scale minimum	(SCAMIN)	See clause 2.5.9	IN	0,1
information		See clause 2.4.6	C	0,*
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) (NINFOM)		(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 Sector, Physical AIS Aid to Navigation, Radar Transponder Beacon, Retroreflector, Signal Station Traffic, Signal Station Warning	Association	0,*
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)	Nautical Information	Association	0,1

† The sub-attribute **name usage** may be mandatory for certain encoding combinations for instances of complex attribute **feature name**. See clause 2.5.8.

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 at the optimum display scale of the ENC data, 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:

- 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**, berths as **Berths**, pontoons as **Pontoon**, mooring posts as **Pile**.
- 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.
- If the waterway is not navigable at the optimum display scale for the ENC data, the area under the covering structure should be encoded as **Land Area**. If it is considered important that information such as clearances and dimensions of the structure are included (for example if the ENC is the largest optimum display scale ENC data covering the area), the covering structure should be encoded as **Structure Over Navigable Water**. If this information is not considered important, the covering structure should be encoded as a **Harbour Facility** feature (see clause 22.7).
- 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; Harbour Facility; 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.

6.2 Building

<p>IHO Definition: BUILDING. A free-standing self-supporting construction that is roofed, usually walled, and is intended for human occupancy (for example: a place of work or recreation) and/or habitation. (Defence Geospatial Information Working Group; Feature Data Dictionary Register, 2010).</p>				
<p>S-101 Geo Feature: Building (BUISGL)</p>				
<p>Primitives: Point, Surface</p>				
<p><i>Real World</i></p>		<p><i>Paper Chart Symbol</i></p>		<p><i>ECDIS Symbol</i></p>
S-101 Attribute	S-57 Acronym	Allowable Encoding Value	Type	Multiplicity
building shape	(BUIHP)	5 : high-rise building 6 : pyramid 7 : cylindrical 8 : spherical 9 : cubic	EN	0,1
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	0,1 †
condition	(COND TN)	1 : under construction 2 : ruined 5 : planned construction	EN	0,1
elevation	(ELEVAT)		RE	0,1
feature name		See clause 2.5.8	C	0,*
language		ISO 639-2/T	(S) TE	1,1
name	(OBJNAM) (NOBJNM)		(S) TE	1,1
name usage		1 : default name display 2 : alternate name display 3 : no chart display	(S) EN	0,1 †

function	(FUNCTN)	2 : harbour-masters office 3 : customs office 4 : health office 5 : hospital 6 : post office 7 : hotel 8 : railway station 9 : police station 10 : water-police station 11 : pilot office 12 : pilot lookout 13 : bank office 14 : headquarters for district control 15 : transit shed/warehouse 16 : factory 17 : power station 18 : administrative 19 : educational facility 20 : church 21 : chapel 22 : temple 23 : pagoda 24 : Shinto shrine 25 : Buddhist temple 26 : mosque 27 : marabout 28 : lookout 29 : communication 30 : television 31 : radio 32 : radar 33 : light support 34 : microwave 35 : cooling 36 : observation 37 : timeball 38 : clock 39 : control 40 : airship mooring 41 : stadium 42 : bus station 44 : sea rescue control 45 : observatory 46 : ore crusher 47 : boathouse 48 : pumping station	EN	0,*
height	(HEIGHT)		RE	0,1
multiplicity of features			C	0,1
multiplicity known			(S) BO	1,1
number of features			(S) IN	0,1
nature of construction	(NATCON)	1 : masonry 2 : concreted 6 : wooden 7 : metal 8 : glass reinforced plastic 12 : glass	EN	0,*
radar conspicuous	(CONRAD)		BO	0,1

reported date	(SORDAT)	See clause 2.4.8	TD	0,1
status	(STATUS)	4 : not in use 7 : temporary 8 : private 12 : illuminated 13 : historic 14 : public	EN	0,*
vertical clearance fixed			C	0,1
—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 26 : mean water level 28 : higher high water large tide 29 : nearly highest high water 30 : highest astronomical tide 44 : baltic sea chart datum 2000	EN	0,1
vertical length	(VERLEN)		RE	0,1
visual prominence	(CONVIS)	1 : visually conspicuous 2 : not visually conspicuous 3 : prominent	EN	0,1
scale minimum	(SCAMIN)	See clause 2.5.9	IN	0,1
information		See clause 2.4.6	C	0,*
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	1,1
text	(INFORM) (NINFOM)		(S) TE	0,1 †
pictorial representation	(PICREP)	See clause 2.4.12.2	TE	0,1
in the water			BO	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 Air Obstruction, Light All Around, Light Fog Detector, Light Sector, Physical AIS Aid to Navigation, Radar Transponder Beacon, Retroreflector, Signal Station Traffic, Signal Station Warning	Association	0,*
Component of	Aids to Navigation Association (see clause 25.2)	Deep Water Route, Fairway System, Traffic Separation Scheme, TwoWay Route	Aggregation	0,1
Component of	Range System Aggregation (see clause 25.13)	Range System	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)	Contact Details, Non-Standard Working Day, Service Hours, Nautical Information	Association	0,1

† The sub-attribute **colour pattern** is mandatory for buildings that have more than one value populated for the sub-attribute **colour**.

The sub-attribute **name usage** may be mandatory for certain encoding combinations for instances of complex attribute **feature name**. See clause 2.5.8.

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

INT 1 Reference: D 5-6, 8, 13; E 10.1, 10.3, 11, 13-18; F 51, 60-63

6.2.1 Buildings (see S-4 – B-325; B-328.1; B-362.2; B-370.3; B-370.5; B-372 and B-373.1-4)

Waterfront, landmark and some public buildings should be encoded precisely and individually on the larger optimum display scale ENC data. When representing buildings generally, forming urban and suburban areas, villages, and other built-up areas, the aim of the compiler must be to create the correct impression of the extent of the built-up area and the density of the buildings.

Within built-up areas, only waterfront, landmark, and certain public buildings of interest should be encoded individually.

Scattered buildings of no individual importance must be omitted when more than about 1 mile (or 2 kilometres) inland. Nearer the shore they may be generalised by encoding a few representative buildings, sufficient to give the correct impression of building density.

Public buildings, with the possible exception of Post Offices and Hospitals, are charted mainly as visual features or points of reference ashore, not for their interest for particular functions. Except where they could be useful landmarks for navigation, they should be encoded only on largest optimum display scale ENC data.

Buildings constructed as places of worship often form significant landmarks; their size and structure incorporating towers, spires, cupolas, etc often render them conspicuous. These buildings when known to be prominent or conspicuous should be encoded up to several miles inland, with sufficient information to enable them to be easily identified. When the optimum display scale for the ENC data permits, the building should be encoded as a surface feature with attention being drawn to any significant features (landmarks).

If it is required to encode a building (other than a landmark, tank, silo or structure covering or extending over navigable water), it must be done using the feature **Building**.

Remarks:

- For landmarks, see clause 7.2; for silos, tanks and water towers, see clause 7.3; for structures covering or extending over navigable water, see clause 8.x. For common encoding combinations, see clause 7.1.
- The feature association **Structure/Equipment** (see clause 25.15) must only be used with **Building** features if the main purpose of the building is to act as an aid to navigation (for example a lighthouse).
- A ruined building should be encoded in the same way as the feature in good condition, but with attribute **condition** = 2 (ruined).
- ~~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 **Pile**. 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 the water but not intended for navigation underneath, 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 in the water it is not required to encode any supporting structures (for example piles, stilts).
- ~~The complex attribute **vertical clearance fixed** must not be populated, unless the building is located over navigable water (that is, attribute **in the water** set to *True*), for example, for boathouses.~~
- When a building is shown as a surface, indicating its true shape, and it is required to encode a prominent feature such as a tower or spire that is part of the structure, two features must be created (see Figure 6-1 below):
 - a **Building** feature of type surface for the main building,
 - a **Landmark** feature of type point for the prominent feature.

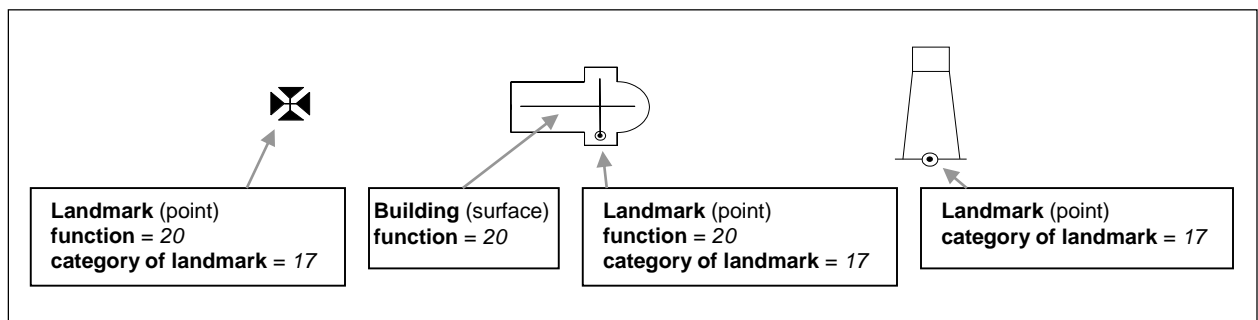


Figure 6-1 – Landmarks

- If available and considered important for route planning and/or monitoring, the vertical uncertainty associated with encoded vertical clearance values should also be encoded.

6.2.2 Harbour offices (see S-4 – B-325)

If it is required to encode a harbour office, it must be done using a **Building** feature, with the attribute **function** taking at least one of the values:

- 2 - harbour-masters office
- 3 - customs office
- 4 - health office
- 11 - pilot office

6.2.3 Transit sheds and warehouses (see S-4 – B-328.1)

If it is required to encode a transit shed or warehouse, it must be done using a **Building** feature, with attributes **function** = 15 (transit shed/warehouse), and if it is required, **feature name (name)** = name or number of the shed.

Distinction: Built-Up Area; Coast Guard Station; Landmark; Rescue Station; Silo/Tank; Structure Over Navigable Water.

† The attribute **colour pattern** is mandatory for landmarks that have more than one value populated for the attribute **colour**.

The sub-attribute **name usage** may be mandatory for certain encoding combinations for instances of complex attribute **feature name**. See clause 2.5.8.

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

INT 1 Reference: D 8; E 10.2-10.4, 22-31; L 11; Q 100

7.2.1 Buildings, landmarks, tanks, silos (see S-4 – B-373; B-373.6; B-374.3-5; B-374.7; B-375.1-2; B-456.2; B-487.3)

Depending on height and the topographic relief, structures considered to be landmarks should be encoded up to several miles inland.

Waterfront, landmark and some public buildings should be encoded precisely and individually on the larger optimum display scale ENC data. When representing buildings generally, including urban and other built-up areas, the aim of the compiler must be to create the correct impression of the extent of the built-up area and the density of the buildings.

If it is required to encode a landmark (other than a tank or silo), it must be done using the feature **Landmark**.

Remarks:

- For buildings, see clause 6.2; for silos, tanks and water towers, see clause 7.3. For common encoding combinations, see clause 7.1. For wind turbines, see clause 7.4. **For structures covering or extending over navigable water, see clause 8.x.** For flare stacks on offshore platforms, see clause 14.1.1.
- The feature association **Structure/Equipment** (see clause 25.15) must only be used with **Landmark** features if the main purpose of the structure is to act as an aid to navigation (for example a lighthouse).
- A water tower must be encoded, where required, using the feature **Silo/Tank** (see clause 7.3).
- A ruined landmark should be encoded in the same way as the feature in good condition, but with attribute **condition** = 2 (ruined).
- Radio and television masts and towers are likely to be visible over long distances and should be encoded as landmarks, even when well inland. They will usually carry air obstruction lights.
- To aid identification of landmarks by the Mariner it may be useful to add the height of the top of the structure above ground level (**vertical length**) or above the general height datum (**height**).
- Buildings constructed as places of worship often form significant landmarks; their size and structure incorporating towers, spires, cupolas, etc often render them conspicuous. These buildings when known to be prominent or conspicuous should be encoded up to several miles inland (see Figure 7-1 below, examples (a) and (b)).
- The attribute **category of special purpose mark** should only be used if the **Landmark** is used as the front or rear lead for a transit, clearing line or measured distance, or for a leading line. Values for **category of special purpose mark** such as 16 (leading mark), 17 (measured distance mark) or 41 (clearing mark) in particular should be used for these purposes.
- Values **category of landmark** = 26 (bridge) and 27 (dam) must only be used if the feature is encoded using point geometry; and must not be encoded over navigable water. Bridges and dams encoded using curve or surface geometry must be encoded using features **Bridge** (see clause 6.6) and **Dam** (see clause 8.11) respectively.
- For landmarks located in 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 in the water it is not required to encode any supporting structures (for example piles).
- When a building is shown as a surface, indicating its true shape, and it is required to encode a prominent feature such as a tower or spire that is part of the structure, two features must be created (see Figure 7-1 (b) below):
 - a **Building** feature of type surface for the main building,
 - a **Landmark** feature of type point for the prominent feature.

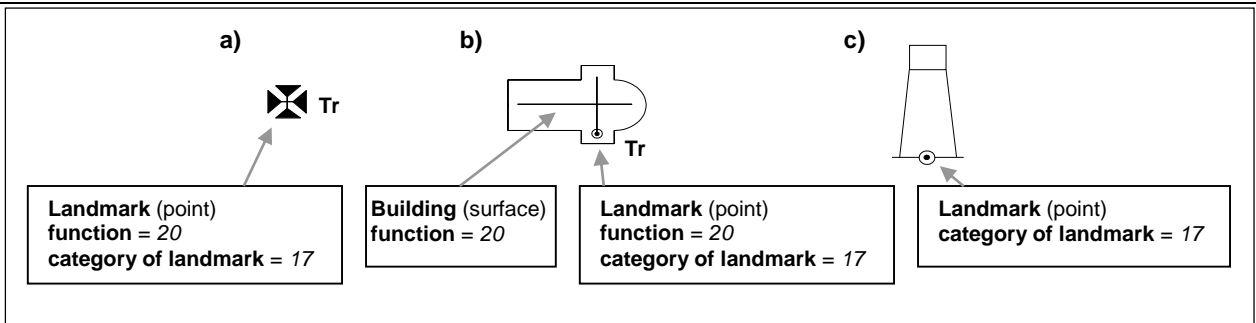


Figure 7-1 – Landmarks

- Not all landmarks are visually conspicuous. If a feature is visually conspicuous (that is, it is distinctly and noticeably visible from seaward), the attribute **visual prominence** must be encoded (see S-4 – B-340).

Distinction: Building; Daymark; Pylon/Bridge Support; Silo/Tank; Special Purpose/General Beacon; **Structure Over Navigable Water**; Wind Turbine.

† The sub-attribute **name usage** may be mandatory for certain encoding combinations for instances of complex attribute **feature name**. See clause 2.5.8.

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: F 10, 11.1, 50

22.7.1 Harbour facilities (see S-4 – B-320 and B-321.5)

If it is required to encode a harbour facility (**except structures covering or extending over navigable water**), it must be done using the feature **Harbour Facility**.

Remarks:

- Fishing harbours or ports are equipped to provide for the particular needs of fishing boats. Boat harbours and marinas are areas of sheltered water, generally within harbours or ports, set aside for the use of small craft, usually with moorings, buoys, and, in the case of marinas, berthing facilities.
- Depending on the navigational purpose, harbour facilities are defined by: an area including docks, basins, and dockside equipment; or a point.
- If it is required to encode a terminal with facilities to load/unload or store shipping containers, this should be done using **Harbour Facility** with attribute **category of harbour facility** = 10 (container terminal).
- If it is required to encode a covered terminal **in or extending over navigable water** into which ships can go **at the optimum display scale of the ENC data**, this must be done using a **Structure Over Navigable Water** feature (see clause 8.x) **Harbour Facility** with the purpose of the terminal defined by **category of harbour facility**. ~~The roof of the terminal may be encoded using the attribute **nature of construction**, and the maximum height and/or draught of vessels able to use the terminal encoded using the complex attribute **information** (see clause 2.4.6). Alternatively, the roofed structure may be encoded using a **Building** feature (see clause 6.2).~~
- Each VHF-channel should be indicated through an associated instance of the information type **Contact Details**, attribute **communication channel** (see clause 24.1).

Distinction: Small Craft Facility; **Structure Over Navigable Water**.