PORT INFORMATION MANUAL

Version 1.3.1

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Document Revision history

Version 1.0	**April 2019**	**Initial Versoin Created**
Version 1.3.1	**June 2019**	**Updated following initial comments.**
Version 1.4	**July 2019**	**Updated following Gothenburg meeting and feedback**

1. The Need to improve Port Information

1.1. General – Purpose of Document

An improvement of port information normally requires an investment decision. Such a decision needs to be supported by arguments justifying a return on investment or improvement in performance. As every port is different, the business case per port will be different.

The subjects described in this section apply to some degree to every port and suggest potential areas of investment in port development which allow for an increase in both efficiency and safety.

1.2. Setting the scene

In 2018 the last implementation phase of the International Maritime Organization (IMO) Regulation 19, Chapter V was completed, resulting in Electronic Navigational Charts (ENC's) in use on board of most commercial SOLAS vessels. Although the systems used to navigate SOLAS vessels have progressed enormously in the last 20 years and navigational practice has developed and adopted digital methods, the data content within an ENC is fundamentally the same as within a paper chart. This still leaves mariners with large information gaps which have been present for many years during port entry or exit.

In the same timeframe the pressure to conform to environmental regulations has increased with the IMO adopting a strategy to reduce by at least 50% the greenhouse gas (GHG) emissions from the global shipping sector by 2050.

1.3. Ports as a node in the supply chain

A port is a crucial node in the supply chain. Commercially, a port should be able to connect to the supply chain of the customer to create end to end visibility of the movement of goods and the supporting infrastructure requirements. This includes data connectivity with ships and their shoreside related offices (e.g. fleet operations centre and trading floors). Commercially well over 1.500 ports operate a network with interfaces to hinterland inter-model transportation such as barges, trains and road transportation networks. To achieve this delivery of real time data which meets both nautical and supply chain standards is essential.

Data containing vessel positions is now widely and publicly available in realtime, however information about the vessels current and future activities are obscured and do not adhere to any global standards. Communication between the ship and the port is a however frequently a closed system, which can be improved.

1.4. Port efficiency

As ports try and become more efficient the easiest route to expansion is to utilise currents assets better, either in the form of allowing bigger vessels, or allowing vessels to arrive with a deeper draught, or to allow a more efficient exchange of ships at the berth.
Utilising human resources in a better fashion by automation of e.g. vessel – berth compatibility checks or better data management is another way of making the port more efficient.

1.5. Most sustainable port

Enabling "Just in Time" arrivals (https://bit.ly/2Ku5Biv) is key to the development of efficient shipping and cultivates sustainability by enabling more accurate steaming. On top of this it improves the planning of connected hinterland modalities like trains, barges and trucks.

1.6. Safest port

Most accidents happen in the approaches, anchorages or harbour basins of ports, as this is by far the busiest time for the mariner and vessel. The upfront exchange of nautical pot information, routing, passage plans and weather information is an important risk mitigation strategy. Improvement and rationalisation of pot information will free up the mariner for more essential tasks during the defined period. Today the biggest requirement of mariners, charterers or port data bases is to have a common understanding of the position of the terminal and which berths are connected to that terminal so they can make a quick assessment of whether it is safe to go there. This information differs today from source to source. The upfront exchange of nautical port information, port passage plans and weather information is an important risk mitigating measure.

1.7. Legal position

Together with the legal departments of hydrographic offices, the risk of displaying data, versus the risk of not displaying data but being forced to do so after an incident, has been assessed. Based on their experience it was concluded that sharing data shows due diligence and makes the legal position of the port much stronger if an accident has happened.

Currently, when chartered vessels are involved in an incident, the clauses in the charter party can have severe consequences for the reputation of the port. In most charter parties there is a "safe port, safe berth, always afloat clause". Meaning that a charterer may send a vessel only to a safe port and to a berth that is safe and where it can always lie afloat. In other words, the Charterer has to warrant to the Owner the safety of the place to which he or she intends to send the ship.
Based on a series of court judgements all over the world a widely accepted legal definition of a(n) (un)safe port is the following:

> *"A port will not be safe unless, in the relevant period of time, the particular ship can reach it, use it and return from it without, in the absence of some abnormal occurrence, being exposed to danger which cannot be avoided by good navigation and seamanship."*

The key element in this definition (and case law) is that the set-up of a port, its structure, should be okay. As to what could be regarded as an abnormal occurrence, something similar applies. Just as an example: a severe NW gale might not be an abnormal occurrence, even if such a gale would occur, on average, less than in say each two years, because such a gale is a part of the local weather system. However, a hurricane might not and may be regarded as abnormal.

The foregoing means that a charterer at the moment that he or she selects a vessel for the intended voyage(s) (i.e. prior to the conclusion of a charter party) should obtain information on the following:

- Depths and dimensions
- Specific conditions that may be relevant for the intended call
- Availability of nautical services
- Availability of information when the vessel is entering port

It has to be underlined that the above four requirements are, also according to case law, part of the general 'safe port' requirement. Following an incident, if a court rules that required information was not available, the port might be declared as "unsafe", which has a big impact on the reputation of the port and its business. Because of the safe port/berth warranty that a charterer has to give to the ship owner under a charter party, a *charterer must select a load port / terminal and discharge port / terminal for the intended voyage(s) which are able to comply with these requirements.*

2. The need for a Step by step approach

2.1. General

How and where to start with digitization of port data might seem difficult. This publication recommends a step by step approach, doing the basics first and taking simple steps by focusing on individual areas.

2.2. Focus on vessel movements

A port is a node in the supply chain As most cargo is transhipped to other places, many modes of transportation come together in ports. Currently, the planning of most hinterland modal facilities depend on the planning of deep sea vessel movements, therefore it makes sense to focus first on this aspect of port operations.

2.3. Focus on geographical extent

The scope of port data for the deep sea vessel is restricted to operations between the Pilot Boarding Place and the fender line of the Berth including anchorage areas. Prior to the Plot Boarding Place this data is normally the domain of the national hydrographic office, and beyond the fender line of the Berth this data is normally the domain of the Terminal.

2.4. Focus on data content

Based on a “compliancy first” approach, the scope of the data considered in this publication is based on BIMCO contract clauses (e.g. safe port, safe berth) and IMO resolutions (e.g. berth to berth passage planning):

1. General port data
2. When is the berth position safe
3. When is the port passage safe
4. When is the berth position available
5. When is the port passage available

2.5. Scope re. data development

Each of the following geographic areas are defined in this guide After the definitions of the areas and their components the data content for each of them is defined:

1. Identification of areas: port and terminal
2. Identification of way points: pilot boarding place and berth position
3. Identification of sections: from pilot boarding place to berth position
4. Data field definitions for port and terminal
5. Data field definitions for pilot boarding place and berth position
6. Data field definitions for individual sections

The hierarchical relationship between the geographic areas comprising a port is illustrated in the following diagram: Some terminals may also be connected to the same berth (e.g. tanker terminals)

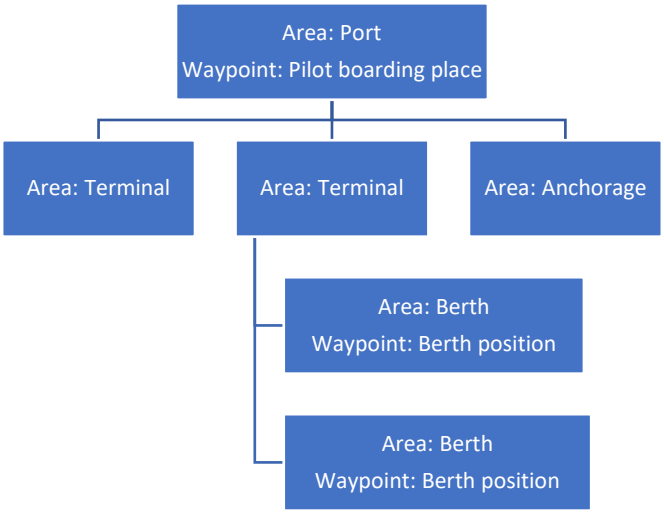


Figure 1: The Hierarchy of areas from Port to Berth.

The hierarchical relationship between sections and waypoints is illustrated in the following diagram:

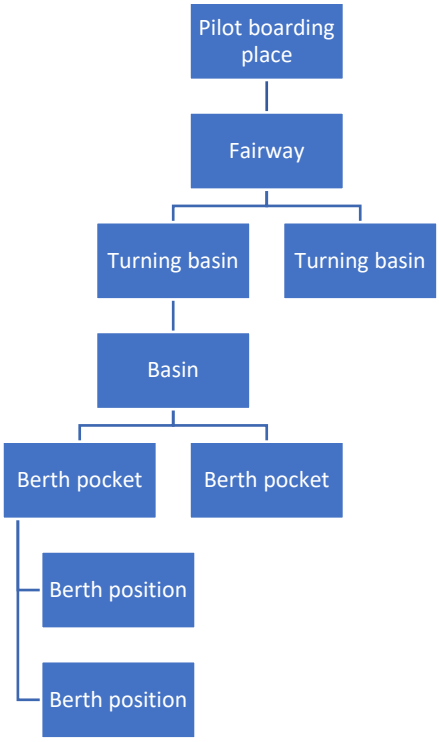


Figure 2: The Hierarchy of sections from Pilot boarding place to Berth position

2.6. Data Ownership

This chapter will be completed based on the findings of a work group, which is evaluating how the various responsibilities are organized today

3. Area and Line Features

3.1. Introduction

This section describes important entities representing the area to which area the ship is going and features of those areas which are represented linearly.

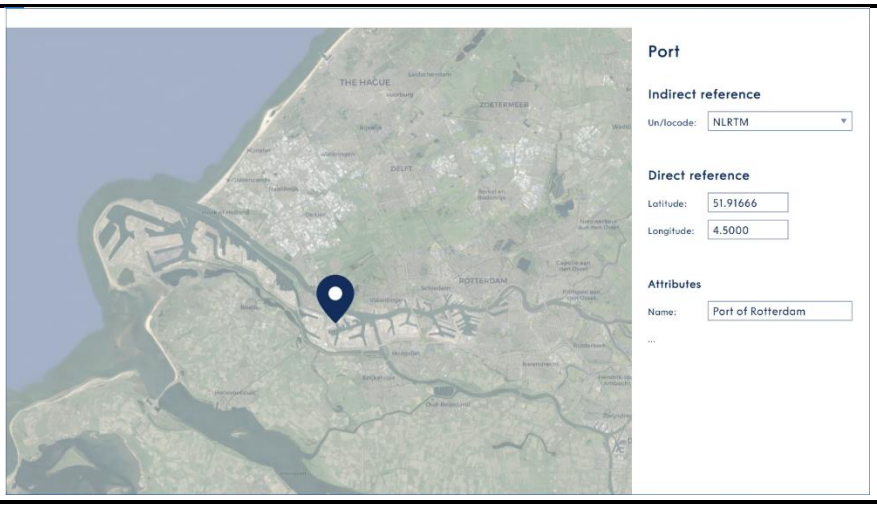
A vessel receives many locations during its port entry/exit. In order of granularity the most important locations for the vessel's port passage plan are:

1. Port
2. Anchorage
3. Terminal

3.2. Port

Name:	Port	Source::
Definition	Any port, terminal, offshore terminal, ship and repair yard or roadstead which is normally used for the loading, unloading, repair and anchoring of ships, or any other place at which a ship can call. The word “port” also embraces geographically , a city or borough which serves shipping interests. Other national standards and frameworks may describe such administrative entities already.	NP100 IHO S-32
Location	A single position which represents the port as a whole. Generally a centre of gravity position is chosen to represent the port’s location. This is aligned with the airline industry.	

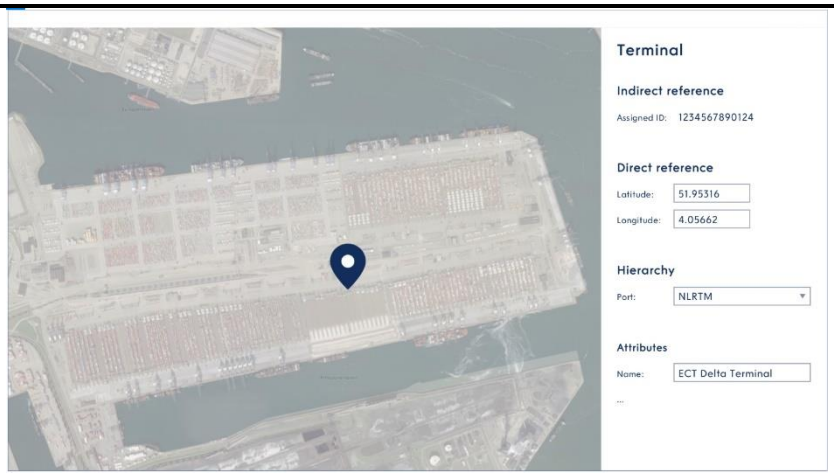
Indirect reference	Direct reference
UN/LOCODE E.g.: NLRTM for Port of Rotterdam	Datum: WGS 84. Held in decimal degrees to a defined precision, (minus to indicate South and West) E.g.: 51.9166666, 4.5000000 = 51 degrees, 55 minutes North, 004 degrees, 30 minutes East for Port of Rotterdam

Attribute(s)	1. Name of the port, e.g.: Port of Rotterdam 2. General port data – See also General Port Information later in this document.
Example image.	

3.3. Anchorage

Name:	**Anchorage**	**Source:**
Definition	An area in which vessels anchor or may anchor.	IHO S-32
Location	A delimited area.	
Indirect reference		Direct reference
Global Location Number (GLN) (ISO/IEC 6523)		Datum: WGS 84. Held in decimal degrees to a defined precision, (minus to indicate South and West) E.g.:
Attribute(s)	1. Name	

3.4. Terminal

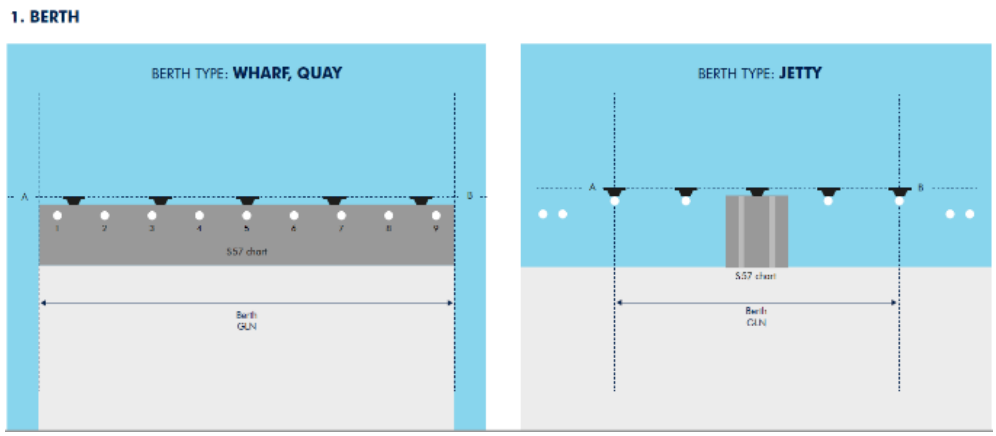
Name:	Terminal	Source:
Definition	A number of berths grouped together and provided with facilities for handling a particular form of cargo, e.g. oil terminal, container terminal	IHO S-32
Location	A single position which represents the terminal as a whole. Generally a centre of gravity position is chosen to represent the terminal's location.	
Indirect reference	Direct reference	
Global Location Number (GLN) (ISO/IEC 6523)	Datum: WGS 84. Held in decimal degrees to a defined precision, (minus to indicate South and West) E.g.: 51.954662, 4.031931for 51 degrees, 57 minutes North, 004 degrees, 2 minutes East for APMT	
Attribute(s)	1. Name of the terminal and/or GISIS number, SMDG or BIC numbers, e.g.: APMT2 2. General terminal data (not specified here, free text and responsibility of terminal)	
Example Image		

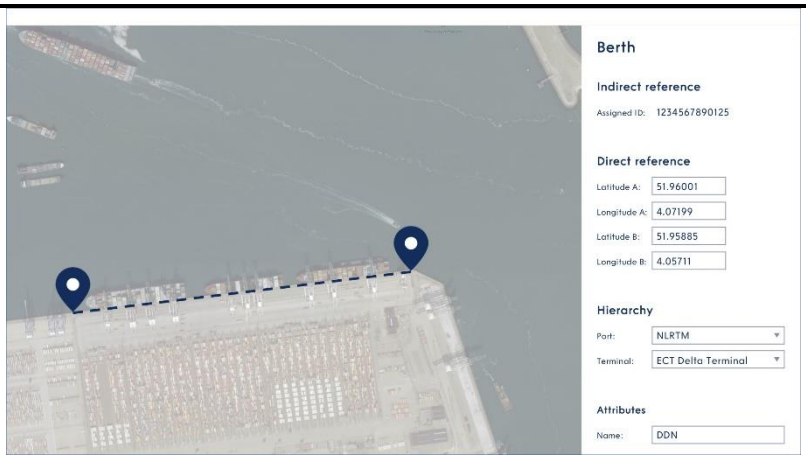
3.5. Berth

Name:	Berth	Source::
Definition	The space assigned to or taken up by a vessel when anchored or when lying alongside a wharf, jetty, or other structure	NP100
Location	Quay walls, berth or jetty: The berth's extent is between its two extremities as shown in the diagram below, measured in a straight line, indicated by A and B. Every point should be named and/or numbered. Orientation is not important. Letters are normally used over numbers. Mooring buoy: The berth extent is between the extremities of the mooring buoy positions	

Indirect reference	Direct reference
Global Location Number (GLN) (ISO/IEC 6523) E.g.: 8719331013789 for APMT terminal in Rotterdam Maasvlakte 2	Datum: WGS 84. Held in decimal degrees to a defined precision, (minus to indicate South and West) E.g.: for APMT2 in Rotterdam: A: 51.95100, 3.99855 B: 51.95816, 4.00733

Attribute(s)	Name of berth E.g.: APMT2





4. Waypoints

4.1. Introduction

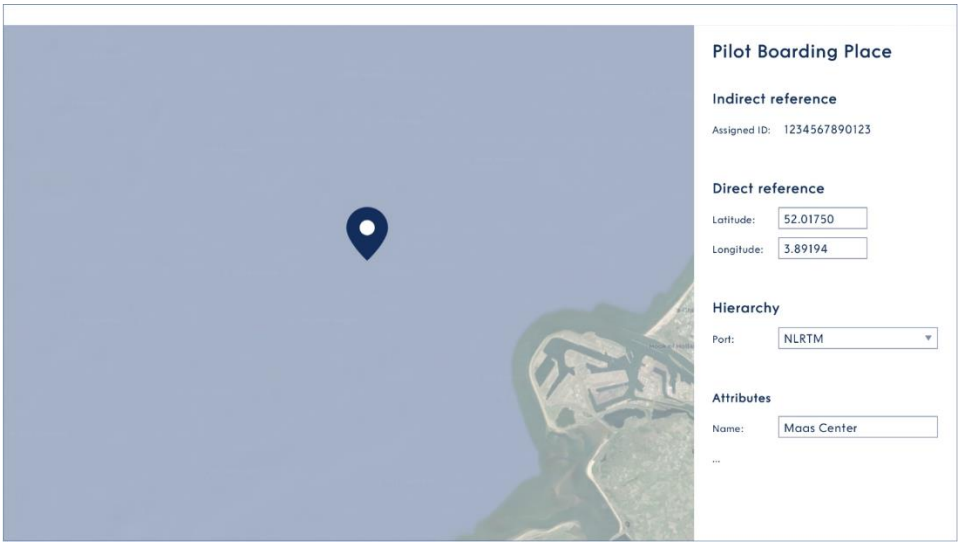
This section defines important waypoints which describe individual locations indicating the positions to which the ship may be navigating. Normally the ship receives the following locations in order of granularity:

1. The position of the Pilot Boarding Place
2. The Berth identifier and Berth Position for the vessel.

The positions defined above, together with additional waypoints are compiled into a port passage plan, a line which connects the various port sections through which the vessel is navigating.

4.2. Pilot Boarding Place

Name:	Pilot Boarding Place	Source
Definition	At sea, the meeting place to which the pilot comes out	IHO S-57 IHO S-4
Location	A single position which represents the pilot boarding place	
Indirect reference		Direct reference
Global Location Number (GLN) (ISO/IEC 6523)		Datum: WGS 84. Held in decimal degrees to a defined precision, (minus to indicate South and West)

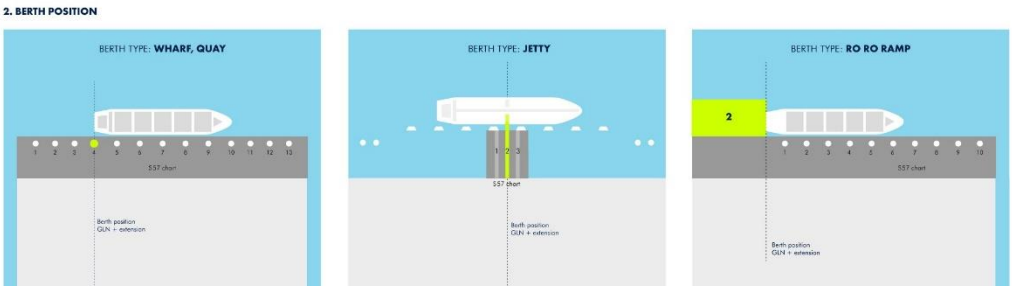
	E.g.: 51.9200000, 4.5000000 for Maas Center
Attribute(s)	Name of the pilot boarding place e.g. “Maas Center”
	# 

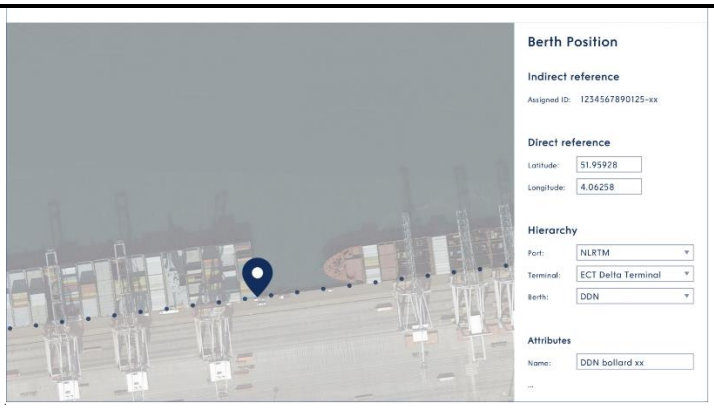
4.3. Berth Position

Name:	**Berth Position**	**Source::**
Definition	The position along the line of a berth, specified by one point (e.g. bollard, manifold or ramp number), allowing the vessel to berth in the correct position along the berth.	IHO S-32
Location	A single point	

Indirect reference	Direct reference
Global Location Number of Berth (ISO/IEC 6523) with extension (for bollard/manifold/ramp number) E.g.: 8719331013789-25 for APMT2 berth bollard 25	Datum: WGS 84. Held in decimal degrees to a defined precision, (minus to indicate South and West) Example: 51.887190, 4.284030

Attribute(s)	1. Name of berth and bollard number 2. E.g. APMT2 bollard 25





Example image

5. Identification of individual sections

5.1. General

Port sections are bodies of water through which the ship is navigating from pilot boarding place to berth. Each body of water has its restrictions, e.g. maximum sizes, conditions or regulations. Normally the ship navigates in the following sections, in order of granularity:

1. Fairway
2. Basin / Turning basin
3. Berth pocket

Name	**1. Fairway** **2. Turning Basin** **3. Basin** **4. Berth Pocket**	**Source:**
Definition	Fairway : The main navigable channel in the approaches to, or within, a river or harbour	NP100
	Turning basin : An area of water or enlargement of a channel in a port, where vessels are enabled to turn, and which is kept clear of obstructions such as buoys for that purpose	NP100
	Basin : A sheltered body of water available for port operations connecting either with the sea, with an outer port or with another basin	IHO S-32
	Berth pocket : Body of water at the berth or anchor berth with sufficient footprint to allow the vessel to make fast to the shore or mooring buoys or to anchor.	NP100
Location	Named bodies of water or delimited sections	
Indirect reference	Direct reference	
Global Location Number (GLN) (ISO/IEC 6523)	Datum: WGS 84. Held in decimal degrees to a defined precision, (minus to indicate South and West) e.g.: 51.9200000, 4.5000000 for Waalhaven	
	1. Additional Identifiers	

Attribute(s)	2. Name of the port

6. Attributes for areas/lines

This section defines a number of data fields for each individual feature. These features can either be area based or line based..

6.1. Port

Additional identifiers

Name of the port

General Port Information

General information about the port

General information

General, introductory information about the port. This should be confined to information not contained in any other definitions

Format:

- Free text

Developments

Details of any active development affecting traffic in the port. Long term development plans should not be covered here but reference can be made to a section on the port website

Format:

- Free text

Limits description

Description of the area covered by the information specified

Format:

- Free text

General information

General, introductory information about the port. This should be confined to information not contained in any other definitions

Format:

- Free text

Developments

Details of any active development affecting traffic in the port. Long term development plans should not be covered here but reference can be made to a section on the port website

Format:

- Free text

Limits description

Description of the area covered by the information specified

Format:

- Free text

ISPS security level

Current security level of the port. Defined by The International Ship and Port Facility Security Code[1]:

Format:

- IPS Security Level: Level 1,2 or 3
- Qualifying Remarks: free text

Load Line Zone

The load line zone in which the port is located. Defined by the IMO's International Convention on Load Lines

Format:

- Free text according to the IMO Load line convention with respect to the seasonal zones: Summer Winter, Tropical,, Winter North Atlantic, Fresh, Tropical Fresh

Maximum vessel sizes

Any size constraints on vessels using the port as a whole. It is not intended to capture constraints that may exist within an individual berth or port section as each section may have its own limits such as channel widths, swinging areas dimensions etc – these should be captured in the appropriate section

Format:

- Maximum length: in decimal metres
- Maximum beam: in decimal metres
- Maximum air draught: in decimal metres
- Supplementary information: free text

Time Zone

Time zone in which the port is located

Format:

[1] http://www.imo.org/

- Standard Time: UTC +/- xx hrs
- Daylight Saving Time: UTC +/- xx hrs
- DST Start: date
- DST End: date

Local holidays

Dates and names of any local or national holidays that may affect the working of the port

Format:

- Name: fee text
- Start Date: date
- End Date: date

Working hours

Working days and hours for the Port Authority, i.e. the times when they are contactable. It does not define the specific working times of various port services or terminals: these should be recorded as individual services

Format:

- Start Day: date
- End Date: date
- Week Day Start: free text
- Week Day End: free text

Cargo

Types of cargo handled by the port

Format:

- Cargo Type: free text
- Weight of Goods: weight of goods or number of containers per calendar year in tonnes
- Supplementary Information: free text

Charts

Charts and Navigational Publications such as tide tables that can be used to navigate the port approaches and port basins and waterways

Format (per chart or publication):

- Chart Number: free text
- Title: free text
- Identifier: free text
- Publisher: free text

Shipping announcements

Local shipping announcements relevant to port users (including hyperlinks to local notices and advisories to mariners or sounding survey publications)

Format:

- Free text

Legal disclaimer

Any additional legal disclaimers that a port wish to make

Format:

- Free text

Website

Hyperlink to the official port website

Format:

- Free text

Contact Information

This section defines the content of contact details.

Contact details will generally be supplied for:

- All people and service providers who are the recipients or reports under the “reports and documentation” section
- The emergency coordination centre
- The service provides referenced under “nautical services” and “vessel services”

General contact information

Introductory text or high level, nonspecific information for contacting people in the port. This does not contain specific name, address or other contact details for any individual or service (these are defined as individual “point of contact”)

Format:

- Free text

Point of contact

Detailed contact information for an official point of contact within the port

Format:

- Individual Name: free text
- Department name: free text
- Role: free text
- Hours of Service: fee text
- Contact Instructions: free text
- Voice Number: free text

- Fax Number: free text
- VHF Channel: free text
- E-mail: free text
- Delivery Point: free text
- City: free text
- Administrative Area: free text
- Postal Code: free text
- Country: free text

Inter ship communication

Specification of a communication channel for vessels in the port or a port section

Format:

- VHF Usage: fee text
- VHF Channel: free text
- Remarks: free text

Weather and Tidal Information

Weather and tide information for the port

Real time weather and tidal information

Links to any official real-time weather or tidal information provided by the port

Format:

- Free text or reference to a port website

Local weather and tidal phenomena

Details of any important local weather of tidal conditions within the port

Format:

- Phenomena: free text
- Details: free text
- Location: free text

Reports & Documentation

Defines the various reports (e.g. notification, declarations, reports) and documentation that a visiting vessel will be expected to send to the port either before arrival, during its stay in port or before and after departure. Port's reports will be in fixed formats and will require completion. Documentation are standardized documents which need to be presented to the port authorities. The exact requirements will vary per port

Pre arrival Reports

Detailed requirements for each report that needs to be sent to the port before arrival

Format:

- Report Category: free text
- Who: fee text
- What: free text
- To: free text
- How: free text
- When: free text
- Remarks: fee text

In port Reports

Detailed requirements for each report that needs to be sent to the port whilst in port

Format:

- Report Category: free text
- Who: fee text
- What: free text
- To: free text
- How: free text
- When: free text
- Remarks: fee text

Pre departure Reports

Detailed requirements for each report that needs to be sent to the port prior to departure

Format:

- Report Category: free text
- Who: fee text
- What: free text
- To: free text
- How: free text
- When: free text
- Remarks: fee text

Documentation requirements

Details of any documentation that vessels will be required to provided to authorities in port

Format:

- Vessel Type: free text
- Document: free text

Regulations and Exemptions

Details of any relevant local regulations that apply in the port such as bunering procedures use of linesmen or Pilot Exemption certificate (PEC). This does not include national or international regulations which may be documented elsewhere.

Regulation

Details of any local regulations that apply in the port or its surrounding water

Format:

- Free text or reference to a port website

Exemptions

Any exemptions that may apply to classes of vessel or suitably qualified people

Format:

- Free text or reference to a port website

Port Safety

Identification of equipment, procedures and points of contact that should be used in case of an emergency within the port

Emergency coordination centre

The Emergency Coordination Centre information for the port. Individuals should be entered as a "Point of Contact" and referenced within this information

Format:

- Free text

Emergency response equipment

Types, locations and availability of emergency response equipment

Format:

- Equipment Type: free text
- Equipment Availability: free text

Emergency procedures

Relevant emergency response procedures

Format:

- Category of Emergency: free text
- Emergency Procedure: fee text

Services

This section defines the individual services that are available in the port

Nautical services

Services related to the safe passage and berthing of the vessel: VTS, Pilotage, Towage/Tugs, Lines

Format:

- Nautical Service Type: free text
- Service Name: free text
- Service Location Description: free text
- Service Area Description: free text
- Service Hours: free text
- Working Hours: free text
- Service Details: free text

Vessel services

Services related to the vessel and her cargo: Bunkers. Lube Oil, Potable Water, Provisions, Stores, Waste per IMO class, Repairs, Lashing, Cargo Survey, Draught Survey, Vetting

Format:

- Vessel Nautical Service Type: free text
- Service Name: free text
- Service Location Description: free text
- Service Area Description: free text
- Service Hours: free text
- Working Hours: free text
- Service Details: free text
- Working Hours: free text
  - Start Day: free text
  - End Day: free text
  - Week Day Start: free text
  - Week Day End: free text

6.2. Anchorage

Additional Identifiers

General Information

6.3. Terminal

Additional identifiers

Name of the terminal

GISIS number for terminals with ISPS

UNLCOCDE with SMDG extension, mainly for container and ro-ro terminals

UNLOCODE with BIC for container terminals

Format:

- Free text

General Terminal Information

General information about the terminal – this is normally the domain of the terminal. Especially oil and LNG terminals might have specified terminal information templates, as per OCIMF or SIGTTO.

6.4. Berth

7. Waypoints and Events

7.1. General

Often the most important information is at what time the vessel arrives at or departs from a certain waypoint. This section details the typical sequence of waypoints for a particular vessel and defines the formatted content for each waypoint.

The general sequence of waypoints is:

1. Estimated Time of Arrival
2. Requested Time of Arrival
3. Planned Time of Arrival
4. Actual Time of Arrival
5. Estimated time of Departure
6. Requested Time of Departure
7. Planned Time of Departure
8. Actual Time of Departure

All times are specified using forms standardised in ISO8601

7.2. Additional identifiers

Name of the waypoint

Format:

- Free text

7.3. Arrival times

Estimated Time of Arrival (ETA)

When a vessel estimates it will arrive at specified location.

Format: yyyy-mm-ddThh:mm:ssZ

Requested Time of Arrival (RTA)

When a vessel is requested to arrive at a specified location.

Format: yyyy-mm-ddThh:mm:ssZ

Planned Time of Arrival (PTA)

When a vessel plans to arrive at a specified location.

Format: yyyy-mm-ddThh:mm:ssZ

Actual Time of Arrival (ATA)

When a vessel arrives at a specified location.

Format: yyyy-mm-ddThh:mm:ssZ

7.4. Departure times

Estimated Time of Departure (ETD)

When a vessel estimates it departs from a specified location.

Format: yyyy-mm-ddThh:mm:ssZ

Requested Time of Departure (RTD)

When a vessel is requested to depart from a specified location.

Format: yyyy-mm-ddThh:mm:ssZ

Planned Time of Departure (PTD)

When a vessel plans to depart from a specified location.

Format: yyyy-mm-ddThh:mm:ssZ

Actual Time of Departure (ATD)

When a vessel departs from a specified location.

Format: yyyy-mm-ddThh:mm:ssZ

8. Attributes for sections

The most important information for sections is the maximum size restriction of a vessel for a particular section, both horizontally and vertically.

The basis for maximum sizes can vary for individual sections:

- Fairways: normally the maximum draught is the limiting factor.
- Turning basins: normally the maximum length is the limiting factor, based on the turning basin diameter.
- Basins: normally the entrance to the basin is the limiting factor. This can be both length and beam.
- Berthing pockets: normally the maximum length is dictated by the length of the berth. The maximum beam is often dictated by the minimum required clearance for other ships to pass the safely. Therefore the maximum beam could be exceeded after a cross check with the local authorities confirm no other traffic is scheduled.

8.1. Horizontal restrictions

Maximum length

Maximum permitted length overall (LOA)

Units: decimal metres

Minimum Parallel Mid-Body alongside

The minimum PMB requirement for the berth during time alongside, including both arriving and departing the berth

Units: decimal metres

Maximum beam

Maximum permitted beam

Units: decimal metres

Maximum Arrival Displacement

The maximum displacement of the vessel on arrival at the berth

Units: Tonnes (1000 kg) or Tons (2240lb)

Maximum Displacement Alongside

The maximum displacement of the vessel whilst alongside the berth

Units: Tonnes (1000 kg) or Tons (2240lb)

8.2. Vertical restrictions

Maximum draught

Maximum depth of the keel below the water line at any point along the hull [NP100]

Units: decimal metres to a defined water density measured in kg/m3

Maximum air draught

Maximum permitted air draught

Units: decimal metres

Maximum draught (including air draught) is the most discussed value within shipping. It should be provided together with the following data elements to ensure all actors have the same understanding of the safety margins:

Maintained depth [NP100]

The Depth at which a channel is kept by human influence, usually by dredging

Units: decimal metres with reference to a specific Sounding Datum

Sounding [IHO S-32]

Measured or charted depth of water or the measurement of such a depth

Units: decimal metres with reference to a specific Sounding Datum

Overdredge [NP100]

An additional depth margin provided by a dredging operation to ensure that the depth at a specific location is never less than the pre-determined maintained depth over the interval between programmed dredging operations

Units: decimal metres

Height of tide [IHO S-32]

The vertical distance between the chart datum to the level of the water at a particular time

Units: decimal metres with reference to a specific Sounding Datum

Observed depth

The vertical distance from the sea surface to the sea floor, at any state of the tide

Minimum Water Density [NP100]

The minimum water density value within a particular area. Density is equivalent to specific gravity and represents the ratio. At atmospheric pressure, of the weight of a given volume of sea water to that of an equal volume of distilled water at 4 degrees Celsius

Units: kg/m3

Fresh Water Allowance (FWA) [NP100]

The change in draught of a vessel due to the difference between salt and fresh water

Units: decimal metres

Under Keel Clearance (UKC) [IHO S-32]

The distance between the lowest point of the ship's hull, normally some point on the keel, and the sea bottom.

Units: a defined value in decimal metres or a percentage of draught and/or beam

Under Keel Clearance policy

A restriction imposed by an authority on a vessel to ensure the depth below the keel meets an acceptable (usually minimum) single or range of values

Units: decimal metres or a percentage of draught and/or beam

Nature of Bottom [from IHO S-57]

The feature of the bottom including the material of which it is composed and its physical characteristics.

Format: Fixed format text according to **IHO S-4 and IHO S-57** values E.g. Sand, Mud, Clay, Silt, Stones, Gravel, Pebbles, Cobbles, Rock, Boulder, Coral

9. Port Passage Planning

9.1. Introduction

This part of the guide contains definitions which relate to passage planning. Definitions have been aligned with IMO Resolution A.893 (21), IMO STCW Code section A-VIII/2 part 2, and Solas Ch. 5 Reg 34, IMO MSC.232(82) and nomenclature widely used by ECDIS manufacturers.

9.2. Explanation of elements.

Voyage Plan

Consists of a sea passage plan and a port passage plan

Sea Passage Plan

Covers the intended navigation from the pilot boarding place of the port where the voyage commences to the pilot boarding place of the port of arrival

Port Passage Plan

The part of the Voyage Plan from the Berth Position (or anchor berth) to the pilot boarding place and from the pilot boarding place to the Berth Position (or anchor berth). It consists of a route plan, manoeuvring plan, and berthing plan

Route Plan

Consists of a track, waypoints, legs, corridors, no go areas, safety contour, safe speed, speed limit, safety margin and commit point

Manoeuvring Plan

The plan for the dynamic positioning phase of the voyage, i.e. for the final approach to the berth or anchor berth

Berthing Plan

The intended static positioning of the vessel once at berth position or anchor berth

Track

The line that connects all waypoints

Waypoint

Geographical points used to join the legs of the route. Each waypoint is associated with a turn radius *(measured in nautical miles with 1 decimal)*

Legs

Geographical lines that connect a waypoint with the following one. Legs are defined by their orientation from the true north in degrees (from 000 to 359)

Corridor

The areas on each side of the track that represent the planned navigable area for a specific vessel. A corridor is associated to a leg and it is defined by its starboard width and port width (in meters) from the track

No Go Area

Non-navigable geographical areas (polygons) defined by a safety contour or by fixed man-made structures (breakwaters, berths)

Safety Contour

The bathymetric line (in meters with 1 decimal) referred to the chart datum and defined by the vessel maximum draught plus the expected reduction of UKC due to the motion in the water

Safe Speed

An interval of expected speeds over ground per each leg (min and max in knots and decimal knots)

Speed Limit

Any speed restriction (in knots with 1 decimal) associated to any leg, either in due to regulations or safety of navigation

Safety Margin

The geographic area between the edges of the corridors and the no go areas available as reserve in case of unplanned circumstances. The safety margin can also be the reserve speed over ground between the speed limit and the max planned speed

Commitment Point

It is the geographic point of no return located on the track, beyond which the vessel is committed to enter a fairway (either inbound or outbound)

10. Appendix 1 – Determining Standards for port information

10.1. Standards within ports

For official declarations, notifications and to facilitate international trade, ports use existing global standards (FAL documents, WCO standards, UNCEFACT). However for real time day to day operations ports generally use national or local standards, and a migration to common, globally defined standards requires both investment and culture change.

Therefore, together with the wider marine industry stakeholders, including ports, shipping, their agents, standardization bodies (www.portcalloptimization.org) only robust, global, cross industry standards within the shipping industry and beyond (e.g. World Meteorological Office, International Standardization Organization) have been selected, ensuring a sustainable investment of money and hours. That content was then cross checked with numerous international bodies including The International Harbour Master Association (IHMA), International Association of Marine Aids to Navigation and Lighthouse Authorities (IALA), United Kingdom Hydrographic Office (UKHO), International Hydrographic Organization (IHO),

BIMCO , Oil Companies International Marine Forum (OCIMF), GS1, International Standardization Organization (ISO.

Because ports act as a node in the supply chain, and their customers need more and more end to end visibility, connectivity to supply chain standards is important. Therefore GS1 has been adopted in this publication as the most global and robust standardization body spanning the broader supply chain.

Similarly, as ports are part of a global network for commercial vessels, standardized terms from the nautical domain have been used for master and event data descriptions. IHO and UKHO publications have been referred to as the most global and robust standardization body for nautical standards.

Long term maintenance of standards is as critical as the selection of the individual standards themselves, and, having learnt from other industries that robust maintenance from the outset by a robust organization saves time and money, ISO standards have been selected as a framework where possible. Maintenance of some standards might be delegated to related organizations such as GS1 or UNCEFACT.

Because the common interpretation of the information by different actors is crucial, the focus of development was first on the functional definitions to ensure adoption of common semantics. For real time data exchange the overall requirement is for interoperability, so a data format has been proposed, based on existing supply chain standards. Interfaces are possible, although the number of interfaces is ideally limited.

10.2. Direct or indirect references?

This publication makes the distinction between locations determined directly and indirectly. Indirect references have the advantage over direct references as they do not change after updates of infrastructure or ownership. Generally, direct references, positions referenced to a particular datum are used in navigational charts and other publications.

10.3. Standards for indirect location references

Many indirect references for ports exist. UNLOCODE[2] is an existing ISO standard (ISO 3166), and is used today in many documents like Bill of Lading. It is not perfect and is undergoing a process of revision currently, but is the best combination of global footprint and level of detail available to the stakeholder community.

[2] UNLOCODE – United Nations Code for Trade and Transport locations from United Nations Economic Commission for Europe https://www.unece.org/cefact/locode/service/location.html

For indirect refences of port areas, waypoints and port sections the Global Location Number (GLN)) is an existing ISO standard (ISO/IEC 6523), which has global governance and is used a billion times on a daily basis in the supply chain industry. It is the only guaranteed globally secure, unique number and can be used in combination with local identification numbers. GLNs are purchased through a national GS1 office, which is available in every country. GLNs can be assigned by the port authority so the number does not change after change of owner ship of the berth (like the IMO number of the vessel).

Other identifiers within port areas also exist and have been evaluated. The Inland ECDIS ISRS number has not been selected as they are specific to inland waters only. GISIS numbers have not been used as they are specific to the terminal only, and only for terminals with ISPS. Similarly UN/LOCODEs with SMDG extension have not been used, as they only apply to the terminal, and are specific to container or roro terminals. These codes are only unique if used together with the UN/LOCODE, and change after change of ownership. UN/LOCODE with a BIC extension have not been used, as it maintains a database for container terminals only. Future standards such as the MRN number do not yet have the sufficient global governance. Future interfaces between MRN and GLN are possible which preserves uniqueness through interoperable standards. The MRN environment already allows for the use of GLN, so GLN may continue to be used within MRN if the MRN environment is widely adopted in future.

10.4. Standards for Direct location references

Direct references are almost always defined as positions in relation to some kind of defined global, local or regional datum. Decimal degrees is preferred with a negative value signifying (by convention) a hemisphere of South and West. There is a distinction between the storage of direct location references and their representation in digital systems. Use of the representation format for display avoids any ambiguity and, although not as user friendly as traditional display formats such as degrees, minutes and seconds, can mitigate any risks of conversion. IHO standards for positioning within electronic charts use decimal degrees (although navigation systems such as ECDIS may have different display formats for positions). IHO S-57 and IHO S-100 both use a fixed level of precision (usually 7 decimal places) for direct position references in charts.

It is left to the data producer to establish an appropriate number of decimal places for positional representation and to establish and publicise appropriate information concerning positional accuracy. IHO S-57, S-4 and S-32 define terms associated with these concepts and accepted custom and practice in this area. Other standards bodies such as ISO have similar mechanisms for representing positions and use decimal numbers to represent coordinates within a fixed coordinate reference system (CRS). The ISO19100 provides a comprehensive framework for the representation of all geospatial data and is the common ancestor of the IHO standards.

10.5. Datums

Positions should always be referenced with respect to a defined horizontal and vertical geodetic datum as part of a defined Coordinate Reference System (CRS). For horizontal datums WGS 84 is preferred

as it is the mandated standard for positions within electronic navigational charts[3], replacing the variety of datums used in global paper charts prior to the standardisation of navigational materials. A large series of datums is defined within the global geospatial community, the most notable of which are the EPSG codes defined by the International Association of Oil and Gas Producers[4]. ISO19111[5] (Geographic Referencing by Spatial Coordinates) uses EPSG codes. WGS84 is represented as EPSG:4326 and many legacy CRSs can (and should) be transformed to WGS84 for harmonised portrayal and planning. Future adoption of the International Terrestrial Reference Frame (ITRF[6] which differs from WGS84 by only a few centimetres) within the IHO community may be proposed in the future as the basis of a global reference frame.

10.6. Vertical datum

Similar to Horizontal Datums, standardisation of Vertical datums for direct location references are important and used for specification of both heights (elevation) and depths. Used on navigational charts the choice of vertical datum is referred to as Chart Datum (IHO S-32). These are largely based on tidal datums such as Lowest Astronomical tide or Low Water. IHO defines many terms relating to tidal height and tidal reference surfaces and makes recommendations as to best practice for vertical datum standards to be followed by marine stakeholders. While the exact choice of vertical datum used for soundings, drying heights and heights/elevations is made by the data producer, the IHO specifies best practice for elevations as a High Water datum and a Low Water datum for depths. The exact choice is a local one, however, due to seasonal and hydrological considerations. In areas of negligible tidal variation Mean Sea Level (MSL) is generally used as a vertical datum.

10.7. Times

Representations of times are derived from IMO FAL, BIMCO Statement Of Facts (SOF) forms, Logbooks, and clauses of charter parties. The format Format “Year-month-day-hours-minutes-second Zulu” is from ISO standard (ISO 8601), already widely used in the supply chain industry. Various time dependent definition sources are listed below:

1. **ETA**: Aligned with the IMO FAL definition, enhanced by adding the “specified location” for more accuracy. This is calculated based on current speed to next waypoint and planned speed for the remaining route including speed limitations and other known parameters, such as wind, current, waves.
2. **RTA**: Currently used within ports with “Just In Time” procedures to maximise protection of anchorages and to optimise lock planning. This is now being implemented in contract clauses to enable Just In Time arrivals. The requested time is received on ship from either port (for Pilot Boarding Place) or terminal (for Berth).
3. **PTA**: Is used today in some Electronic Display Information Systems (ECDIS) and is often the arrival time agreed in contract, according to a timetable or based on a time received from port. Normally shared by ship in route plan. Planned Time of Arrival (PTA) does not change, as

[3] IHO S-57 (http://www.iho.int) standard defines WGS84 as the horizontal datum for ENC charts
[4] EPSG codes are defined at http://www.epsg.org/
[5] https://www.iso.org/standard/41126.html
[6] Maintained by the International Earth rotation and Reference Systems service https://www.iers.org/IERS/EN/Home/home_node.html

propulsion is subsequently adjusted to meet this time, based on Speed To Maintain (STM). The STM is calculated based on a defined Distance To Go (DTG) and hours to go to the Planned Time of Arrival and is expressed as a Speed Over Ground (SOG).

4. **ATA**: In current use in the maritime industry. The time stamp is set when a waypoint is reached.
5. **ETD**: Aligned with the IMO FAL definition, enhanced by adding the "specified location" for more accuracy. ETD is calculated based on current speed to next waypoint, planned speed on the remaining route including speed limitations and other known parameters. The estimate can also be based on calculation of the estimated time of completion of cargo or vessel services (e.g. bunkers) or other non-navigational matters.
6. **RTD**: Also used today in ports with "Just In Time" procedures. Now being implemented in clauses of contracts to enable Just In Time arrivals. The requested time is received on ship usually from ports
7. **PTD**: Used today in some Electronic Display Information Systems (ECDIS). Often the departure time agreed in contract, according to a fixed timetable or based on time received from port.
8. **ATD**: Used today in the maritime industry. A time stamp is defined after departing from a specified location.

10.8. Formats for exchange of event data

10.9. General

The overall definitions and unique identifiers of locations are the most important elements of data to agree upon. The encoding format of the data is a second priority, as interfaces are possible between different encodings as required.

EPCIS.

EPCIS is encapsulated in an existing ISO standard (ISO/IEC 19987:2017) and is a global GS1 standard which has been used for over a decade in global supply chains for representation of events. Events may be recorded for any location and any object or entity. EPCSI uses non-significant ID keys where available insulating against future changes to attributes. Ports may use any EPCIS element as needed, with no obligation to use irrelevant elements. EPCIS has a rich pre-existing vocabulary with extensions possible for mode, sector or trade specifics.

11. Publication and promotion of standards

These standards will be promoted via this publication and via a tight alignment with the glossary of NP100, The UKHO's Mariners Handbook. This publication is most frequently available on the bridge of all SOLAS (UN / IMO Safety Of Life At Sea Convention) vessels and in all global port offices.