**INTERNATIONAL HYDROGRAPHIC ORGANIZATION**

# IHO ECDIS PRESENTATION LIBRARY

## USERS' MANUAL

**Edition / revision 3.2, March 2000**

Special Publication No. 52
ANNEX A of APPENDIX 2

published by the
International Hydrographic Bureau
**MONACO**

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**FOREWORD**

The original, 1st Edition of the Presentation Library was developed by SevenCs GmbH, Hamburg on behalf of the Colours and Symbols Working Group of the International Hydrographic Organization, under contract to the Canadian Hydrographic Service and the Royal Australian Navy Hydrographic Service, with funding shared by the United States Coast Guard and the Canadian Coast Guard.

This updated 3.2 Edition has been prepared by Nautical Data International, Inc., St. John's, Nfld, in consultation with Universal Systems Ltd., Fredericton, Canada. Changes from Edition 3.1 are marked in shading.

## CONTENTS OF THE PRESENTATION LIBRARY MANUAL

PART I Use of the Presentation Library

*This part contains an explanation of how to use the Presentation Library, for manufacturers.*

PART II Mariners' Navigational Objects

*This part includes a catalogue of mariners' navigational object classes.*

PART III Supplementary features

*They comprise:*

- *Software to convert CIE colours to RGB*
- *ECDIS Chart 1 for mariners*
- *Colour test / diagram*

ADDENDUM *A hard copy addendum to the Presentation Library Manual is also provided which contains the additional items, symbols and diagrams, that otherwise exist only in digital form on the Presentation Library distribution CD-Rom (NB: the reading of these digital items requires an ECDIS viewer which is not provided with the PL). The addendum contains:*

- *ECDIS Chart 1,*
- *Symbols arranged alphabetically,*
- *List of symbol names with colours and meanings, colour differentiation test diagram.*

*For convenience, the hard copy addendum has been included in the Colour and Symbol Specifications document, IHO Publication S-52 Appendix 2.*

# PART I

## USE OF THE PRESENTATION LIBRARY

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# 1. INTRODUCTION

This manual is intended to explain the IHO ECDIS Presentation Library to the manufacturer, and to help him to use the library. Therefore, it provides the software developer with the information he needs to translate the relatively abstract description of an S-57 object into an effective ECDIS display according to S-52. However, it is not a picture book for ECDIS symbology, since the symbology itself is provided in a machine readable form on the distribution CD-Rom.Instead, it explains how the various parts of the ECDIS Presentation Library are related to each other, how these parts should be used to achieve an ECDIS presentation and how the symbol library can be transferred in a machine readable form.

The concepts and methods defined by the presentation Library to deal with S-57 will significantly effect the ECDIS System design. Manufacturers are advised to consider how to implement the Presentation Library at an early stage in their system development.

ECDIS is at an early stage of development and changes will inevitably be required due to sea experience, to developments in mariners' requirements, and to technical improvements. Changes may be in data or may affect the manufacturers' software (which will be avoided whenever possible). Manufacturers should build into their ECDIS a means of applying such changes once the ECDIS are installed on board ship.

This manual assumes, that the reader fully understands the fundamentals of computer graphics (see section 16 for a bibliography) and that he or she has carefully studied in advance the various standards for ECDIS, i.e., IHO S-52/S-57 (4,5,6,7) and IMO/IHO Draft Performance Standard (3). Although this manual is frequently revised and the authors try to concentrate related information in one place, some details remain buried in various sections of the manual. Therefore, it is strongly recommended to read this manual thoroughly before designing ECDIS software.

Section 2 and 3 of this documentation start with an overview of the Presentation Library. They were written for the reader who is interested in the basic concept. Details that address especially the designer of an ECDIS system are explained from section 4 onwards.

Note that the Presentation Library does not cover all aspects of the ECDIS display. Therefore the IMO Draft Performance Standard (3) as well as IHO S-52 Appendix 2 / C&SS (5) must be studied.

## 1.1 Status of the Presentation Library

The IHO Presentation Library is annex A to the IHO "Colour and Symbol Specifications" (C&SS), which is in turn appendix 2 to IHO S-52 "Specifications for Chart Content and Display Aspects of ECDIS».

The Presentation Library implements the display specifications in the S-52 app.2 by decoding and symbolising the SENC. It contains:

1. the ECDIS symbol library, including the IEC Navigation Symbols,

2. the ECDIS colour tables for day, dusk and night viewing,

3. look-up tables, with symbology instructions linking SENC objects to the appropriate colour and symbol and giving their IMO category, draw priority, priority over radar, and suggested viewing group,

4. conditional symbology procedures for:
   - cases where symbolising depends on circumstances, such as the mariner's choice of safety contour,
   - cases where symbolising is too complex to be defined in a direct look-up table,

5. description of the symbology instructions,

6. mariner's navigational objects, specified in the same format as chart objects for convenience in processing in ECDIS,

7. supplementary features such as the ECDIS chart 1, colour differentiation test diagrams, colour calibration software.

The symbols of the Presentation Library should be replicated in size and shape, using any convenient format. The colour tables should be reproduced within the tolerances given in S-52 app. 2, section 5.2.3. The remaining items may be implemented in any convenient form which produces the same results as the Presentation Library.

## 1.2 S-57 and the Presentation Model for ECDIS

The Presentation Model for ECDIS refers to the official IHO Transfer Standard for Digital Hydrographic Data (S-57) (7). The IHO Transfer Standard states in Part 2, section 3, , which describes the concept of presentation of S-57 chart data representing the real world: ".... The presentation of that information may vary to suit a particular use (e.g., it may be presented either graphically, using symbols, or in textual form). Therefore, the presentation of information is considered to be independent of its storage. Different applications must provide their own specific 'presentation models'. A presentation model defines, via a set of presentation rules, how real world information should be displayed for a specific application. ... "

In contrast to a presentation model suitable for paperchart application, a presentation model to be used by ECDIS systems must take into account the requirements of the IMO/IHO "Performance Standard for ECDIS" (3) and the IHO "Specifications for Chart Content and Display Aspects of ECDIS", IHO Special Publication No.52 (4). In particular, this means, that the presentation of charts on an ECDIS screen changes depending on parameters and selections defined by the mariner, such as safety contour, time of the day, traditional or new symbology, etc. Thus the presentation model must cover not only colour and symbol definitions but also instructions how to handle a dynamically changing presentation as well.

## 1.3 Structure of the Presentation Model for ECDIS

The **Presentation Model for ECDIS** is built from two major parts:

- A library of colours, line styles, fill styles, point symbols and a set of symbology instructions and look-up tables for the translation of object descriptions into symbology instructions. This part is called "**Presentation Library for ECDIS**". It is provided in a machine readable form. The purpose of the format is to handle the initial transfer of a new library edition, as well as individual updates to the Presentation Library.

- A description of a programmable structure, which serves as a functional model for the graphic of an ECDIS system and which explains how to use the elements of the Presentation Library and how to ensure the correct display of data structured according to S-57 (7). This part is called "**Display Generator Concept**".

## 1.4 Packaging of the Presentation Library

The following are the components of the Presentation Library, listed by the disks that carry them:

1.4.1 The digital version of the Presentation Library is issued on a compact disk, which carries a subscription charge for each new edition to help to cover maintenance costs. This contains:

.1 The .DAI file of the "Official Presentation Library", consisting of look-up tables; symbols; and colour tables.

.2 The Presentation Library Manual as a word processed file. This includes the figures for the manual, the symbology procedures in Nassi & Schneidermann diagram form, etc. (See section 1.2.4 below for details).

.3 The "Test Edition version" of the .DAI file, intended for type-approval testing of amendment procedures.

.4 Expanded colour tables & look-up tables;
Expanded symbol library;
Expanded test Edition Look-up table.

.5 "C" program LITDSN for generating light descriptions,
"C" version of diagram conditional symbology procedures.

.6 ECDIS Chart 1 & Colour Differentiation test diagrams:
- S-57 files,
- special chart 1 look-up tables (in a complete "Chart 1 version" of the .DAI file).

.7 Colour calibration software.

1.4.2 The Presentation Library Manual as a word processed file is also issued separately on a disk (or disks) in a pocket attached to S-52 Appendix 2 "Colour & Symbol Specifications for ECDIS". This is intended for users who do not wish to subscribe to the digital version of the Presentation Library. The Manual includes:

.1 the look-up tables and colour tables of the .DAI file, in text form. (The symbols of the .DAI file are bound in the "hard-copy addendum" attached to the "Colour & Symbol Specifications"),

.2 the diagram and narrative conditional symbology procedures in Nassi & Schneidermann form, together with symbolizing instructions (in section 8) for special IMO and IHO requirements which are needed to complete the symbolizing of an ENC,

.3 further information needed for implementing the above in a display generator.

1.4.3 On each occasion of an immediate amendment of the Presentation Library:

.1 a hard copy (or word processed file) description of the items in the amendment will be issued by the IHB in the form of a "Maintenance Document".

.2 a complete replacement of the .DAI files (1.4.1.1 above) will be issued free of charge to subscribers to the digital Presentation Library,

.3 the amended presentation Library Manual will be posted on the IHO web site.

Note that only the contents of immediate amendments and not those of deferred amendments, will be included in .2 and .3 above.

The amendments procedures and the naming of Presentation Library files are described in section 9 of the Presentation Library Manual, and the contents of the files are described in more detail in section 18.

The following two sections describe the Display Generator Concept and give an overview of the Presentation Library.

## 2. BASIC CONCEPT OF A 'DISPLAY GENERATOR' FOR AN ECDIS SYSTEM

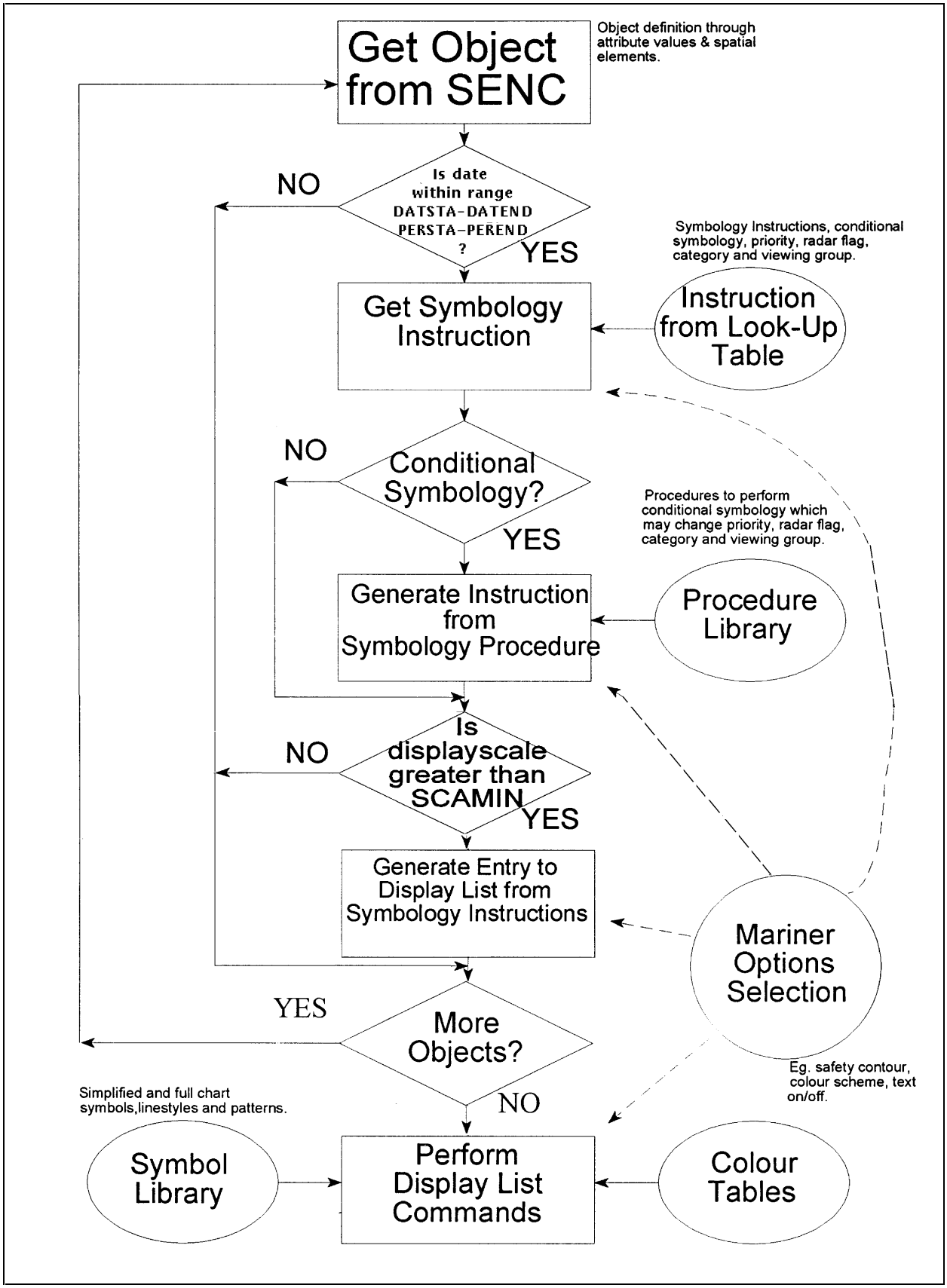
The elements of the Presentation Library are handled by the ECDIS Display Generator that is designed by each manufacturer on his own following the guidelines of this documentation and which performs the link between the object characteristic according to S-57 and the actual presentation on the ECDIS screen. Note that the basic concept for a Display Generator that is described in this section is only an example. There are other concepts to realize the ECDIS presentation. **NOTE ALSO THAT THE DISPLAY GENERATOR IS NOT PROVIDED IN THE PRESENTATION LIBRARY; THE MANUFACTURER MUST DEVELOP THIS.**

Figure 1 shows how the various elements of the Presentation Library can be linked together in order to display an S-57 object from the SENC. Only the individual elements (symbol library, look-up tables, etc.) are provided in the Presentation Library. It is understood, that the ECDIS manufacturer writes software linking these elements. Please note, that section 8 of this manual gives further details that are of interest to the programmer. Note particularly section 8.4 dealing with the display of objects depending on date (e.g. DATSTA, DATEND) or on display scale (SCAMIN).

It is suggested that the ECDIS manufacturer should develop a programmed loop, which retrieves objects one after another from the SENC database. Since the SENC does not contain information how to colour an object or which symbol is to use a symbolization must be derived from the object description. Thus, the object's attribute values are used to search for the appropriate symbology instruction and display priority within a look-up table. If the currently retrieved object is a cartographic object, a translation to the ECDIS symbolization is given in the look-up table. In some cases, the instruction that is found in the look-up table is a call to a conditional symbology procedure. Such a procedure contains a decision making process that uses the object description to generate in turn a straightforward symbology instruction. After this, symbology instructions for the display of the objects are available, regardless of whether they came directly from the look-up table or were generated by a symbology procedure. Then these symbology instructions are interpreted and converted to a set of system specific graphic commands.

Each graphic command is assigned to the display priority that was retrieved from the look-up table before. The display priorities are defined according to the requirements of the IMO and IHO (3) (4). (see 8.3.4).

**Fig. 1 - Display generator concept**



After all objects have been examined by the programmed loop, the display list is filled with graphic commands. The commands are then performed by the ECDIS graphic, which in turn loads symbols from the symbol library and gets the colour values from the colour tables. This method to generate an ECDIS display gives the mariner control over the contents and the appearance of the presentation:

- If he selects, e.g., another safety contour, the display list is renewed in the programmed loop and the depth areas distinguishing shades are changed by a symbology procedure which is called to generate symbology instructions for the object class DEPARE (depth area);
- or symbology instructions which refer to the simplified or paper_chart points, plain_boundaries or symbolized boundaries areas, and lines by switching to another look-up table;
- or the generation of the display list is influenced by a filter suppressing text commands;
- or the colour values for the day time are replaced with the values for the night time by selecting another colour table.

Note that the ECDIS should not initiate any change of state automatically or by linkage, e.g., it should not automatically select»lights» because the mariner selects the night colour table. All changes to the composition of the display should be initiated by the mariner.

## 3. THE ELEMENTS OF THE PRESENTATION LIBRARY - AN OVERVIEW

The Presentation Library consists currently of seven elements:

1. A library of symbols, line styles and fill styles

2. A set of machine readable diagrams that can be displayed on demand and explain the symbology to the mariner (mariners' ECDIS Chart 1)

3. A color coding scheme which includes the IHO colour tables for day and night time

4. A set of symbology command words from which machine readable instructions can be assembled. The result is a symbology instruction which in turn is processed to symbolize S-57 (7) objects.

5. A set of look-up tables that link object description from the SENC database to the appropriate symbology instructions depending on whether:

   a) The link is straight forward, i.e., a direct relationship between an object's description and its presentation such as a buoy or land area. In this case the look-up table provides the symbology instruction to show a symbol, an area fill or a line style.

   b) The link is conditional, i.e., depending on circumstances, for example a depth area, whose colour fill depends on the choice of the safety contour. In this case the look-up table refers the decision to a conditional symbology procedure that then selects the appropriate symbology instructions.

6. A set of conditional symbology procedures to decide the appropriate symbolization in cases determined by the mariner’s selection (e.g., safety contour) or in complex symbols (e.g., light sectors).

7. A catalogue of navigational object classes that comprise objects that the mariner may add to the chart and that cannot be defined by means of S-57. (See S-57/App.2/ann.A/part 2)

The following sections give a short description of the elements of the Presentation Library.

### 3.1 The Colour Coding Scheme

The Presentation Library uses a colour scheme, which classifies colours by their usage (see section 4). Each colour usage is represented by a token that is a five-letter code. Each colour token corresponds to a colour definition given in CIE coordinates in one of a set of colour tables for different brightness conditions. Symbols, fill styles and line styles refer to the colour tables by using the standardized colour tokens as part of the symbol definition. The contents of the colour scheme are supplied in a machine readable format on the distribution CD-Rom. See section 4 on how to use colour tokens, section 10.4 on how colour tables are transferred and section 13 for a listing of the colour coordinates. ECDIS manufacturers should also refer to section 4 of the Colour and Symbol Specifications (C&SS) (5) for details of the design and use of colours.

### 3.2 The Library of Symbols, Fill Styles and Line Styles

ECDIS manufacturers should also refer to section 3 of the C&SS (5) for details of the design and use of symbols, line & fill styles.

#### 3.2.1 Symbols

The Presentation Library supplies a set of simplified symbols according to the IMO Draft Performance Standards as well as a set of standard symbols that were designed according to the International Chart 1 (2). This allows changing the ECDIS display from paper chart (INT1) to simplified (S-52) symbolization and vice versa. Symbols are supplied in a machine readable format on the distribution CD-Rom. See section 7.2 and 10.6 for further details.

#### 3.2.2 Fill Styles

The Presentation Library offers various ways to fill areas. They can be filled with an opaque colour; or with a colour shown with some transparency; or with a pattern of symbols (fill pattern). Fill patterns are introduced as a solution for the symbolization of areas in special situations. When using the traditional (paper chart) way, e.g., to symbolize the traffic direction by using an arrow, it might happen that the arrow-symbol moves off the screen because the size and position of the viewing window on the ECDIS chart cannot be predetermined. A fill pattern showing arrows does not have a certain position on the chart like the paper chart arrow-symbol. It shows up as long as any part of the traffic separation lane can be seen on the screen.

The Presentation Library provides look-up tables for plain area boundaries (intended for use at small scale to reduce clutter) and symbolized area boundaries (intended for use at very large scale to show immediately on which side of the boundary the area lies and to identify the area). Note that centred symbols should still be used with symbolized boundaries to symbolize the case when the entire display window lies within an area.

Fill patterns are supplied in a machine readable format on the distribution CD-Rom. See section 7.4 and 10.5 for further details.

### 3.2.3 Line Styles

The Presentation Library uses two types of line styles: simple line styles and complex line styles. Simple line styles are solid, dashed or dotted lines with varying colour and thickness. Complex line styles are composed of repeating line patterns.

Line styles are supplied in a machine readable format on the distribution CD-Rom. See section 7.3 and 10.7 for further details.

## 3.3 Symbology Instructions

The ECDIS picture is generated from symbology instructions. The symbology instructions are in turn assembled from a set of symbology command words which have been designed for the Presentation Library. Symbology command words are machine readable orders, which can be decoded in a straightforward manner to low level graphic actions that are performed by the ECDIS program to generate the ECDIS picture.

Currently there are five types of symbology instructions:

- instructions for line objects
- instructions for area objects
- instructions for point objects
- instructions for text labels
- call to conditional symbology procedure

Symbology instructions are explained in section 7.

## 3.4 Conditional Symbology Procedures

The majority of objects can be presented in a straightforward manner: symbology instructions for lines, areas or symbols are used.

To handle complex presentation situations conditional symbology is required. Conditional symbology is different from standard symbology in such a way, that a procedure is processed rather than a straightforward symbology instruction. Thus decisions are made by the computer while it is creating the presentation of an object, which affect symbolization and perhaps also priority, radar flag, category, viewing group.

Conditional symbology will be used as future requirements arise for which conditional symbology give the simplest or most effective solution. This version of the Presentation Library provides an initial set of conditional symbology procedures. See section 12 for further details. Manufacturers should note that these may be updated in future.

## 3.5 The Look-Up Tables

Instructions on how to symbolize an instance of an object class can be found in look-up tables that come with the Presentation Library on the distribution CD-Rom.

Due to the need for ECDIS to operate as a real-time navigation display, using a CRT in place of the paper chart, a number of new symbols have been introduced. These identify the safety contour, no data areas, etc. In addition, a simplified and more visible set of buoy and beacon symbols have been developed for bad viewing conditions, such as bright sunlight or at night.

There are five look-up tables:

paper chart point symbols
simplified point symbols
line symbols
plain area boundary symbols
symbolized area boundary symbols

The manufacturer should allow the mariner to select between the two point symbol tables and the two area symbol tables.

Each line of a look-up table, called a look-up table entry, contains the code of the addressed object class, a string of attribute-value combinations and symbology instructions or a call to a conditional symbology procedure which in turn creates symbology instructions.

To find the correct symbolization for an instance of an object class the look-up table is entered with the object class code and its presentation-relevant attribute values. The resulting symbology instructions can then be processed by the Display Generator of the ECDIS system.

Every entry to the look-up tables matches either all objects of an object class or a subset. Therefore, the look-up tables are also used to assign the objects to the IMO/IHO display category, display priority, radar flag and optional viewing group. The viewing groups may be used by the mariner to either reduce or add information shown on the screen.

Look-up table entries are supplied in a machine readable format on the distribution CD-Rom. See 8.3, 10.2 and section 11 for further details.

## 3.6 Mariners' ECDIS Chart 1 diagrams

A set of symbol diagrams in the form of S-57 compliant charts are included in Part 3 of the Presentation Library, for use as a Mariners ECDIS Chart 1. The manufacturer should set these up for display on request to explain the use and meaning of the symbols, through cursor picking referring to the symbol descriptions given in the symbol library.

## 3.7 Catalogue of Mariners' Navigational Object Classes

Some ECDIS symbols represent objects, which are not defined in S-57, e.g., a way point or a line of position. Thus, and to allow ECDIS manufacturers to handle navigation symbols by same means like S-57 or chart objects, the Presentation Library comes with its own catalogue of navigational objects. As a result, a waypoint can be stored in the SENC and it will be presented on the ECDIS screen using symbols, line styles and fill styles of the Presentation Library. The symbology instruction suitable for a navigational object can be found in the look-up tables like the symbology instruction suitable for any S-57 object class.

Because navigational object classes are nonstandard object classes, the class code is a lowercase 6 character acronym according to S-57. Therefore, they do not interfere with S-57. The navigational object classes are derived mainly from CIRM-symbols and C&SS (5) specifications.

Please see S-52 / Appendix 2 / Annex A / Part 2 for further details and definitions of the mariners' navigational object classes.

### 3.8 Test version of the Presentation Library

The test version of the Presentation Library, required by IEC 1174 section 6.5.1 is described in section 8.3.5 and contained in section 11.4.

## 4. DESCRIPTION OF THE COLOUR CODING SYSTEM

The colours of the Presentation Library for ECDIS are named with a five character code that reflects their usage, e.g., CHMGD for "chart magenta, dominant". These names are called "colour tokens". The colour tokens are used by symbology instructions, symbols, line & fill styles and to enter the colour tables (see section 13) where the colours are identified by CIE-coordinates. The method of converting CIE colour coordinates into RGB values for a specific CRT is given in annex B to appendix 2 of S-52. The software for processing colour calibration observations, converting CIE to RGB colour coordinates, and verifying the results is included in Part 3 of the presentation Library. ECDIS manufacturers should also refer to section 4 of the Provisional Colour and Symbol Specifications (PC&SS) (5) for details of the design and use of colours. The colours are designed to meet different conditions of illumination on the bridge.

The colour tokens are organized in a colour scheme that groups the tokens in colour sections. Each colour section contains a set of colour tokens that serves a special purpose, e.g., to provide colours for the chart content. Note that the number of tokens is currently limited to 64, to fit the architecture of present day computers.

Because user interfaces based on window systems will have a strong influence on the design of ECDIS-Systems, colours for the user interface are included in the colour scheme as well.

Changes to the CIE colour coordinates must be expected as experience accumulates; these should be relatively easy to handle. Changes to the organization of the scheme may also be required, but these will be avoided as far as possible. The colour definitions in CIE-coordinates as well as the usage of the colours are required. To handle changes to the colour values in a flexible way, the tables for the CIE-coordinates are attached to this publication in a separate section (see section 13).

Please also see section 14 if you are interested in details how to implement the colour scheme on most graphic systems.

### 4.1 The Colour Scheme

This section explains the structure of the colour scheme and the usage of the colour tokens. Note that the colour values themselves are listed in the colour tables of section 13. The latest actual version of the colour tables can be found in a machine readable form on the distribution CD-Rom.

**General Uses**

| Token | | Colour | Usage |
|---|---|---|---|
| TRNSP | - | transparent | (invisible pixels) |
| NODTA | - | grey | (areas without chart data) |
| CURSR | - | orange | (cursor colour,VRM,EBL) |

**Colour Section I / Chart Contents (31 uses)**

| Token | | Colour, day/night | Usage |
|---|---|---|---|
| CHBLK | - | black/grey | (general) |
| CHGRD | - | grey, dominant | (general) |
| CHGRF | - | grey, faint | (general) |
| CHRED | - | red | (general) |
| CHGRN | - | green | (general) |
| CHYLW | - | yellow | (general) |
| CHMGD | - | magenta, dominant | (general) |
| CHMGF | - | magenta, faint | (general) |
| CHBRN | - | brown | (general) |
| CHWHT | - | white | (general) |
| OUTLW | - | black | (symbol outline on sea area background) |
| OUTLL | - | pale/dark brown | (symbol outline on land area background) |
| LITRD - | red | | (red lights) |
| LITGN | - | green | (green lights) |
| LITYW | - | yellow | (white/yellow/orange/amber lights) |
| ISDNG | - | magenta | (isolated danger) |
| DNGHL | - | red | (danger highlight) |
| TRFCD | - | magenta, dominant | (traffic control features) |
| TRFCF | - | magenta, faint | (traffic control features) |
| LANDA | - | brown | (Land areas) |
| LANDF | - | brown | (Landforms, land features) |
| CSTLN | - | black/grey | (Coastline, shoreline constructions) |
| SNDG1 | - | grey | (deep soundings > safety depth) |
| SNDG2 | - | black/white | (shallow soundings <= safety depth) |
| DEPSC | - | grey | (safety contour) |
| DEPCN | - | grey | (depth contours) |
| DEPDW | - | white/black | (deeper than selected deep contour) |
| DEPMD | - | pale/dark blue | (safety contour to selected deep contour) |
| DEPMS | - | light/medium blue | (shallow contour to selected safety contour) |
| DEPVS | - | medium/light blue | (zero meter contour to shallow contour) |
| DEPIT | - | yellow-green | (high water line to zero meter contour) |

**Colour Section II / Radar Image Overlay (3 uses)**

| Token | | Colour | Usage |
|---|---|---|---|
| RADHI | - | green | (high intensity echo or single int. echo) |
| RADLO | - | green | (low intensity echo & target trail) |
| ARPAT | - | green, dashed | (ARPA, target symbols & infos) |

**Colour Section III / Mariners' & Navigation Information (3 uses)**

| Token | | Colour | Usage |
|---|---|---|---|
| SCLBR | - | orange | (scalebar) |
| CHCOR | - | orange | (chart corrections) |
| NINFO | - | orange | (Navigators Notes) |
| ADINF | - | yellow | (mariners' transparent area fill and manufacturers' points and lines) |

**Colour Section IV / Reserved for Future Requirements (8 uses)**

| Token | | Colour | Usage |
|---|---|---|---|
| RESBL | - | blue | (reserved for line features) |
| RESGR | - | grey | (reserved for line features & screened areas) |
| RES04 | - | not specified | (reserved for future use) |
| RES05 | - | not specified | (reserved for future use) |
| RES06 | - | not specified | (reserved for future use) |
| RES07 | - | not specified | (reserved for future use) |
| RES08 | - | not specified | (reserved for future use) |

**Colour Section V / Ship symbol & Planned Route (5 uses)**

| Token | | Colour,day/night | Usage |
|---|---|---|---|
| SHIPS | - | black/white | (own ship, Co&SpMG vector) |
| PSTRK | - | black/white | (Past Track) |
| SYTRK | - | black/white | (Secondary Track) |
| PLRTE | - | red | (planned route & notations) |
| APLRT | - | orange | (alternate planned route) |

**Colour Section VI / User Interface (11 uses)**

| Token | | Colour,day/night | Usage |
|---|---|---|---|
| UIBCK | - | white/black | (background user interface components) |
| UIBDR | - | grey, dominant | (user interface border components) |
| UIAFD | - | medium/light blue | (dominant fill colour) |
| UIAFF | - | brown | (faint fill colour) |
| UINFD | - | black/white | (dominant textual information) |
| UINFF | - | grey | (faint textual information) |
| UINFR | - | red | (textual information) |
| UINFG | - | green | (textual information) |
| UINFO | - | orange | (textual information) |
| UINFB | - | blue | (textual information) |
| UINFM | - | magenta | (textual information) |

**These colours are to be used whenever a user interface is on the same screen as the chart display.**

## 4.2 Notes on the Sections of the Colour Scheme

### 4.2.1 General Uses

The colours of this section are in use in combination with every section of the whole colour scheme:

**TRNSP** - This means a 100% "transparent" colour. This is not a "real" colour since it is invisible. Every pixel on the screen, which has the colour value 0 shows up as 100% transparent. In case the pixel was already painted with another (visible, e.g., black) colour this colour is not overwritten by the transparent colour. In case the pixel was cleared before or not yet painted the "background" colour shows up (see **NODTA**).

**NODTA** - This abbreviation stands for "No Data". This colour shows up on every pixel on the screen, which is neither covered by chart features nor covered by other elements of the ECDIS display (e.g., radar overlay, user interface). Thus, it can also be called the "empty background colour" (see **TRNSP**).

**CURSR** - In most graphic systems the cursor is treated as an item that can be handled completely independent from the graphic of the chart area. Therefore the cursor was given its own colour and it is kept separately from the other sections of the colour scheme. The cursor colour is also used by variable range marker (VRM), electronic bearing line (EBL), parallel indexing lines and other tools to perform absolute and relative measurements in the chart.

### 4.2.2 Colour Section I / Chart Contents

The colours in this section are designed for chart display. The selection of the colours is a compromise between minimum bitplane consumption (5 bits) and flexibility for future changes in the colour composition. Some colours can be used in general, others are reserved for specific types of feature purposes.

**CHBLK, CHGRD, CHGRF, CHRED, CHGRN, CHYLW, CHMGD, CHMGF, CHBRN, CHWHT** - This selection of colours is used in general to design symbols and chart line features as well as fill styles. They are not used in cases where other colours are available for a special usage.

**OUTLW, OUTLL** - These colours are used to outline symbols depending on which background they are normally shown (water/land).

**LITRD, LITGN, LITYW** - Light symbols have their own colours to give the opportunity to influence their colour luminance individually. Yellow (**LITYW**) is used for white, yellow, orange and amber lights because it might be difficult to distinguish these colours from each other on a badly calibrated monitor. It also follows the tradition to show up white lights with a yellow flare or coloured arc.

**ISDNG** - Since the isolated danger symbol forms one of the most important items on the ECDIS screen, it was given a separate colour.

**DNGHL** - This colour is used for symbology that highlights mariner selected dangers. The mariner decides during route planning which features are highlighted by this colour.

**TRFCD, TRFCF** - Traffic separation schemes are complex chart features. The navigator is confronted with important elements of the schemes and with less important elements as well. **TRFCD** is used to distinguish important traffic routing features.

**LANDA** - This colour is used for land areas in general.

**LANDF** - Landforms and land features are given a contrasting brown.

**CSTLN** - The coastline is a very important feature of the chart. If a radar image is combined with the chart picture it is required that coastline elements clearly show up on top of the green radar picture (see also **RADHI/RADLO**). To have full control over this combination under all conditions (day/night) a separate colour is reserved for coastline features.

**SNDG1** - This colour is used for soundings that are deeper than the selected safety depth ("safe" soundings).
**SNDG2** - This colour is used for soundings that are shallower than or equal to the selected safety depth ("unsafe" soundings).

**DEPSC** - This colour is reserved for the selected safety contour.
**DEPCN** - All depth contours other than the safety contour should use this colour.

**DEPDW, DEPMD, DEPMS, DEPVS, DEPIT** - These are depth shades. The depth zones are:

**DEPDW:** areas deeper than the mariner-selected deep contour;
**DEPMD:** areas between deep contour and the mariner-selected safety contour;
**DEPMS:** areas between safety contour and the mariner-selected shallow water contour;
**DEPVS:** areas between shallow water contour and the low water line (zero meter contour);
**DEPIT:** areas between zero meter contour and coastline (intertidal).

For route monitoring it may be desirable to distinguish only two shades: deeper than own-ship's safety contour and shallower than safety contour. In that case **DEPDW** and **DEPVS** should be used. This is the only option available at night.

### 4.2.3 Colour Section II / Radar Image Overlay

#### 4.2.3.1 Radar Overlay

The radar image overlay can be generated by using either one intensity or a range of intensities of the radar colour. The colour for high echo intensity (**RADHI**) should be used in case you show only one intensity. If you prefer to show more than one echo intensity or fading target trails, the corresponding colour intensities should be interpolated between the colour for high echo intensity (**RADHI**) and the colour for low echo intensity (**RADLO**). A separate colour token is used for ARPA targets and infos tagged on them (**ARPAT**).

#### 4.2.3.2 Transparent Radar

Optionally, the manufacturer may vary the radar green overlay by making it transparent. As described in section 7.4.2, there are two ways of doing this:

1) Use "pixel swap" transparency, as described in detail in section 7.4.2.
2) by mixing the fill and underlaying colour at each pixel to give a continuous transparency change from 0% to 100%. This must be done in such a way that no appearance of colour or shape change occurs in any SENC feature on the display, at any intermediate transparency value

### 4.2.4 Colour Section III / Mariners' & Navigation Information

This section provides colours for mariners' notes and navigation info. **SCLBR** is used to generate the scalebar. Hand-entered chart corrections are marked by the colour **CHCOR**. Mariners' notes of any form (Symbols, Text) are generated using the colour **NINFO**.

### 4.2.5 Colour Section IV / Reserved for Future Requirements

There is very little experience with ECDIS up to now. The colours of this section are reserved for future requirements.

### 4.2.6 Colour Section V / Ship Symbol & Planned Route

This section groups colours that apply to the ship symbol and objects associated to it. Own ship symbol, course over ground and speed over ground vector are shown in the colour **SHIPS**. The past track of the main position sensor and a secondary position sensor is shown in **PSTRK** and **SYTRK**. The planned route uses the colour **PLRTE** as well as the symbol set for the planned route elements (waypoints, etc.). The alternate route is shown in **APLRT.**

### 4.2.7 Colour Section VI / User Interface

This section is composed of ten colour tokens to be used in coding information in the user interface area. The foreground and background colours have been selected with the intent of ensuring the visibility and legibility of information in this area and, at the same time, not distracting the mariner while viewing the chart. Thus, UIBCK is white in the light background colour sets and black in the dark background colour sets. This helps ensure the visibility of information in bright sunlight and helps maintain the mariner's dark adaptation at night. At the same time, it keeps average luminance in the two areas consistent. Large differences in brightness between the chart and the user interface area could be distracting to the mariner when viewing the chart. For the same reason, the amount of information in the user interface area should be keep to a minimum and excessive differences in luminance between the foreground and background should be avoided. Thus, UINFD should be used for limited important text information only.

To ensure legibility, alphanumerics should be between 24 and 30 minutes of arc at the viewer's eye. The use of the UINFR (red) and UINFB (blue) tokens should be avoided for large amounts of text especially under low ambient illumination. The use of colours that vary widely across the spectrum can be fatiguing because of the need to constantly refocus when switching between them. In addition, the eye is less sensitive to red in low ambient illumination. In general, the use of several different colours, several different fonts, and excessive highlighting should be avoided because these practices can interfere with human processing of information.

The user interface area should have a border, especially at night to delineate it from the chart area. The use of a solid line, 3 pixels wide, in UIBOR is recommended. Note that the selection of colours for the user interface area and the guidelines given above are likely to change as experience accumulates.

For further information on the design of visual interfaces, the following articles are recommended:

1. HFS (1988). American National Standard for Human Factors Engineering of Visual Display Terminal Workstations. ANSI/HFS 100-1988. Santa Monica, CA: The Human Factors Society Inc.

2. Mullet, K. and Sano, D. (1995). Designing Visual Interfaces. Mountain View, CA: SunSoft Press.

3. Post, D. L. (1992). Applied color vision research. In H. Widdel and D. L. Post (Eds.), Color in Electronic Displays, (pp. 137-174). New York, NY: Plenum Press.

4. Walraven, J. (1992). Color basics for the display designer. In H. Widdel and D. L. Post (Eds.), Color in Electronic Displays. (pp. 3-38). New York, NY: Plenum Press.

## 5. THE VECTOR SYMBOL DESCRIPTION LANGUAGE

This section describes the format that is used by the Presentation Library to define point symbols, complex line-styles and fill patterns.

Note that the manufacturer may construct his own bitmap version of these symbols if he wishes.

The vector format uses an imaginary "pen". The pen is moved to absolute two-dimensional cartesian coordinates (x,y). The coordinates are within the range of 0 to 32767 units. Each unit represents 0.01 mm. The origin of the coordinates (location 0,0) is on the upper left corner of the two-dimensional space. Thus x-coordinates extend to the right and y-coordinates extend downwards.

Note that vector symbol definitions described by the vector format are transferred within the 'PVCT/SVCT/LVCT'-fields (see section 10). The vector format uses the following instructions:

; The semicolon separates the instructions from each other. Every instruction must be terminated by a semicolon.

, The comma separates the parameters of an instruction from each other. If an instruction does not have any parameter no comma is allowed following the instruction.

**SP colour**

The SP instruction selects a pen with a certain colour. The parameter is a single letter (ASCII >= 64) which identifies a colour token. The token is given in "Colour Reference"-fields (see 10.5.4). The colour-token in turn represents a colour defined in the colour tables (see section 13). An SP instruction remains in effect until a new pen is selected. Thus, all following instructions are performed using the selected pen colour.

**ST transparency**

The ST instruction defines the transparency of the colour that is currently selected (see SP). The transparency is given in steps of 25% (0-3, see 7.4.2). The transparency only affects the polygon fill instruction (see FP) while other instructions (AA, CI, EP, PD) produce opaque drawings.

**SW width**

The SW instruction parameter defines the physical pen-tip width in units of 0.3 millimeters. If a single point is defined, (a pen down with no movement followed by a pen up) then a dot would be drawn using the current line width as a diameter or a square using the current width. (standard pixel diameter; see also 7.3.2).

**PU x-coordinate, y-coordinate [,x,y, ... x,y]**

The PU instruction raises the pen and then moves it to the absolute x,y-coordinates. Thus, no line is drawn by the PU instruction.

**PD x-coordinate, y-coordinate [,x,y, ... x,y]**

The PD instruction lowers the pen at the current position and then moves it to the absolute x,y-coordinates. Thus a line in the current colour (see SP) and width (see SW) is drawn by the PD instruction.

**CI radius**

The CI instruction draws a circle of a specified radius. The radius determines the size of the circle. The current pen position is the centre of the circle. The CI instruction includes an automatic pen down feature. When a CI instruction is used the pen lifts, moves from the centre of the circle to the starting point on the circumference, lowers the pen, draws the circle, then returns with the pen up to the centre of the circle. The circle is drawn using the current pen colour (see SP) and pen width (see PW).

**AA x-coordinate, y-coordinate, arc angle**

The AA instruction draws an arc based on the present pen position and the specified centre point. The x,y coordinates specify the centre of the arc. The arc angle is the angle through which the arc is drawn. A positive angle draws counterclockwise from the current pen position, and a negative angle draws clockwise. The arc is drawn starting at the current pen position and using the current pen colour (see SP) and pen width (see PW). After the arc has been drawn, the pen position will remain at the end of the arc, rather than returning to the beginning.

**PM n**

The PM instruction places the command interpreter in polygon definition mode. In this mode you can construct polygons using other instructions (PU, PD, CI, AA). These instructions are stored in the polygon buffer; they are not executed until the polygon is completely defined. In order to draw the polygon you must fill it with the FP instruction and/or outline it with the EP instruction. To define a polygon move the pen to the desired starting location (see PU or PD). Then execute PM 0 to enter the polygon mode and specify the appropriate instructions to define the shape of the polygon. If you want to define a subpolygon, end the shape with a PM 1 instruction and define the next shape; execute PM 2 to exit the polygon mode. The current pen position before PM 0 is the first point (vertex) of the polygon. The vertices can be defined with the pen up or down (see PU, PD). However, if you intend to outline the polygon with the EP instruction, note that EP will only draw those points that are defined with the pen down. The FP instruction, on the other hand, fills the polygon, regardless of the pen up / down status.

**EP**

The EP instruction outlines any polygon that has been previously stored in the polygon buffer (see PM). Only vertices that were defined with the pen down are edged. They are edged using the current pen colour (see SP) and pen width (see PW). Upon completion of the EP instruction, the original pen position and status are restored.

**FP**

The FP instruction fills a polygon that has been previously placed in the polygon buffer (see PM). The polygon is filled using the current pen colour (see SP) and transparency (see ST). Upon completion of the FP instruction, the original pen position and status (pen up/down) are restored.

**SC symbolname, orientation**

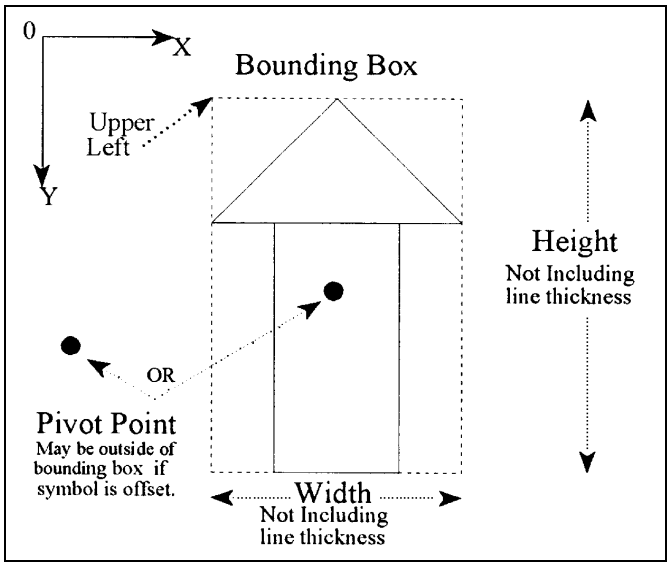
The SC instruction calls another symbol definition. Orientation specifies whether the called symbol is drawn upright (orientation = 0) or rotated to the direction of the last pen moving instruction (orientation = 1). The pivot point of the symbol will be placed on the current pen position. Upon completion of the SC instruction, the original pen position and status (pen up/down) are restored.

## 5.1 Size and Orientation of a Vector-Symbol

For each vector symbol the height and width in units of 0.01 mm are given. Note that the size of a symbol applies to the display resolution specified in S-52 (8) and PC&SS (5). To maintain clarity, any symbol should always be drawn with at least as many pixels as if it were drawn on a chart with a resolution specified by PC&SS (5). Symbols in the Presentation Library are already sized to give good readability and appropriate prominence. Only the ship symbol is currently allowed to be scaled to the actual dimension of the ship.

Every symbol has its own pivot point. The pivot point is the point around which the symbol is scaled and rotated. When the symbol is placed on the display, the symbol's pivot point is positioned exactly on the object's position and all elements of the symbol are geometrically related to that position. For further information about location of the pivot point and the transfer of symbol definitions please see 10.6.

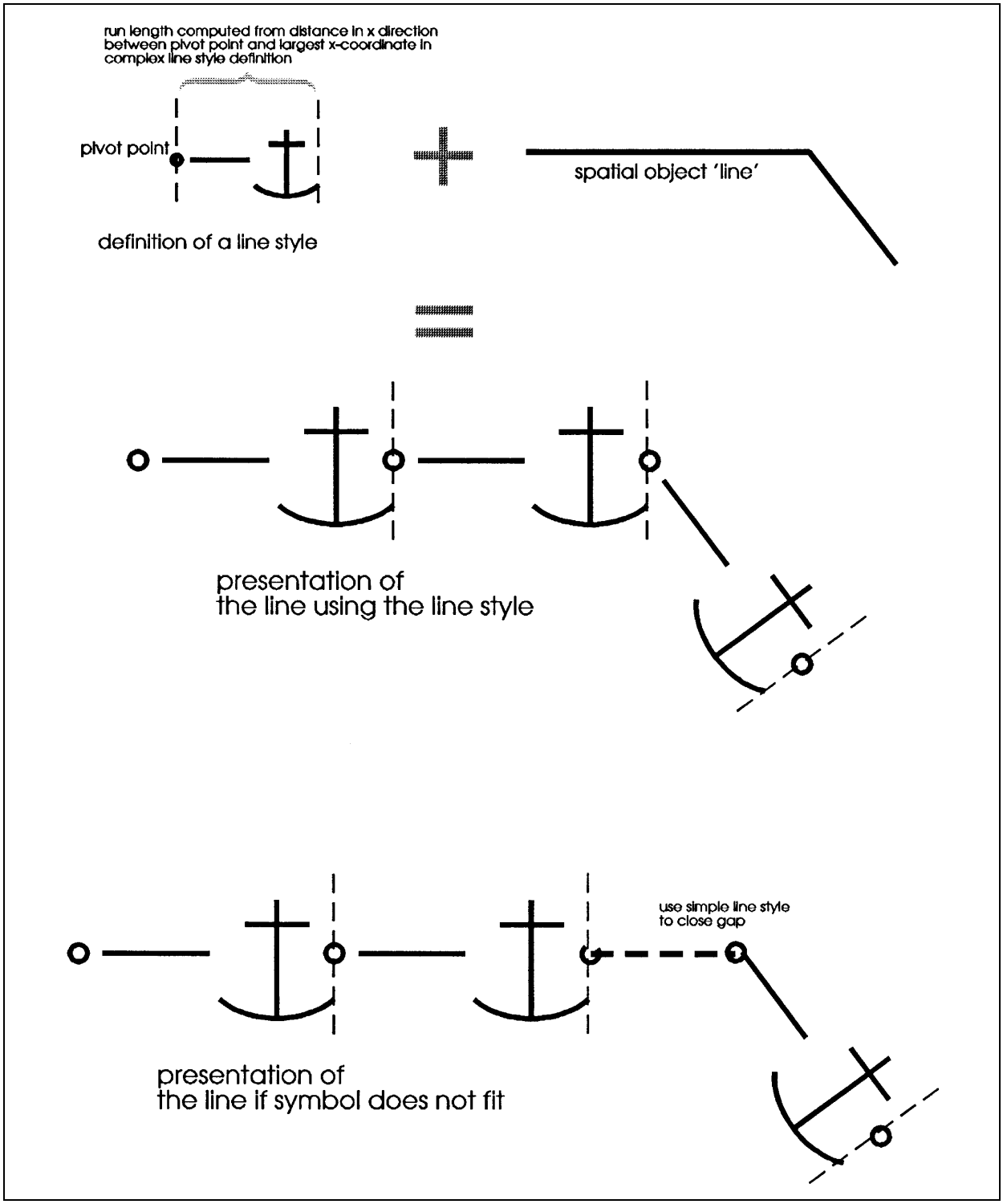
**Fig. 2 - Pivot point and symbol information**




## 5.2 Usage of a Complex Line Style

A complex line style is formed from a repeating symbol. The symbol definition for a line style is very similar to the symbol definition for a point symbol. The line style symbol has its own pivot point around which it is rotated. The orientation is given by the direction between two vertices of the line object that will be presented on the ECDIS screen. The line style symbol is placed with its pivot point on the geometry of the line. The pivot point of the following symbol is placed where the run length of the preceding symbol ends. The run length is calculated by subtracting the largest x-coordinate of the symbol definition from the x-coordinate of the pivot point. If the run length of a line style symbol does not fit between two vertices of a line object, a simple line-style will be used to join the vertices. A dashed line is preferred, but a solid line may be used. The colour and line width are taken from the last drawing instruction within the line style definition of the preceding symbol. For further information about line style definitions see 10.7. It is accepted that the complex linestyle may default to a simple linestyle on any curved or irregular line where the interval between digitised points is less than the run length of the complex line style symbol. However, the ECDIS manufacturer is encouraged to adapt these complex linestyles to fit curved lines with the minimum of defaults to simple linestyle.

**Fig. 3 - Usage of complex line style**




Note: This does not represent a line style in use at present.

## 5.3 Sample Definitions in Vector Format

The following instruction sequences are samples for the use of the Vector Symbol Description Language:

SPA;SW1;PU1000,1000;PD1000,2000;

selects pen 'A', width 1 x 0.3mm, moves the pen to coordinate 1000,1000 without drawing a line, then draws a vertical line from there to coordinate 1000,2000.

SPB;SW2;PU1000,1000;PD1000,2000,2000,2000,2000,1000,1000,1000;

selects pen 'B', width 0.6mm (2 x 0.3mm), moves the pen to coordinate 1000,1000 without drawing a line and then draws a rectangle with upper left corner 1000,1000 and lower right corner 2000,2000.

SPB;ST2;PM0;PU1000,1000;PD1000,2000,2000,2000,2000,1000;PM2;FP;

draws the same rectangle but this time it is defined as a polygon; note that the closing edge is automatically inserted by the PM2 instruction; the polygon fill is performed after the PM2 instruction with the colour of pen B and with a transparency of 50%.

PU100,100;PM0;CI50;PM2;SPE;ST0;FP;SPA;EP;

moves the pen to location 100,100; then a polygon is defined using a circle instruction; after this the circle is filled with an opaque fill using the colour of pen 'E'; at last the circle is outlined with pen 'A'.

SPU;SW1;PU100,100;PD200,100;AA200,150,-90;PD250,200;

draws a horizontal line from location 100,100 to location 200,100 using pen 'U' and width 0.3mm; then an arc is drawn clockwise with radius 50; the centre of the arc is located at 200,150 (remember: origin of coordinate system is the upper left corner); the drawing is finished with a vertical line going from 250,150 (the last vertex of the arc) to location 250,200.

SPC;SW3;PU500,500,1000,1000;SCsample99,1;PD1000,500;

moves the pen to location 1000,1000 drawing an invisible line (pen is up) with a nautical angle of 135 degrees (remember: origin of coordinate system is the upper left corner); then symbol definition sample99 is called; the symbol's pivot point is located at 1000,1000 and it is rotated 135 degrees; Upon completion of the symbol drawing a vertical line is drawn going from 1000,1000 to 1000,500; the draw instruction is performed using pen 'C' and a line width of 0.9mm (3x0.3mm).

## 5.4 Colours and Descriptions for Symbols

The colours and descriptions for all symbols in the symbol library are listed in part 3 section 3 «ECDIS Chart 1" of this document.

# 6. THE RASTER-SYMBOL DESCRIPTION FORMAT

Raster symbols are not supplied in the Presentation Library. However, the manufacturer may make up his own raster version of the vector symbols supplied, so long as they conform to the original in size, colour and general shape.

The following is just one possibility for a raster format:

Each pixel in the raster is represented by a single letter which in turn stands for a specific colour. Every letter with an ASCII-value greater or equal than '@' can be used. Raster locations carrying the '@'-sign are representing a transparent (invisible) pixel.

The following example illustrates the raster description of an anchorage symbol. The raster shows an anchor in red (CHRED, identified by letter 'A') and black (CHBLK, identified by letter 'B'):

```
@@@@@@@@@@@@@@@@@@@@
@@@@@@AAAAAABB@@@@@@
@@@@@@AAAAAABB@@@@@@
@@AAAAAABBAAAAAABB@@
@@AAAAAABBAAAAAABB@@
@@@@@@AAAAAABB@@@@@@
@@@@@@AAAAAABB@@@@@@
@@@@@@@@AABB@@@@@@@@
@@@@@@@@AABB@@@@@@@@
@@@@@@@@AABB@@@@@@@@
@@@@@@@@AABB@@@@@@@@
@@AABB@@AABB@@AABB@@
@@AABB@@AABB@@AABB@@
@@@@AABBAABBAABB@@@@
@@@@AABBAABBAABB@@@@
@@@@@@AAAAAABB@@@@@@
@@@@@@AAAAAABB@@@@@@
@@@@@@@@@@@@@@@@@@@@
```

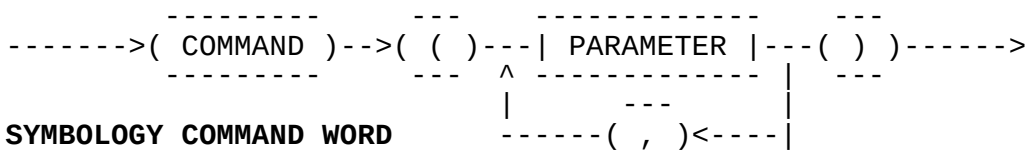
The pivot point of a raster symbol is given by the row number and column number. Note that the size of a raster symbol is not given because it can only be derived from the actual pixel size on the screen of a respective ECDIS system. Rotation of raster symbols is not supported.

## 7. DESCRIPTION OF THE SYMBOLOGY INSTRUCTIONS

Symbology instructions are used in the look-up table entries to perform the symbolization of objects. Currently there is a choice of five symbology instructions:

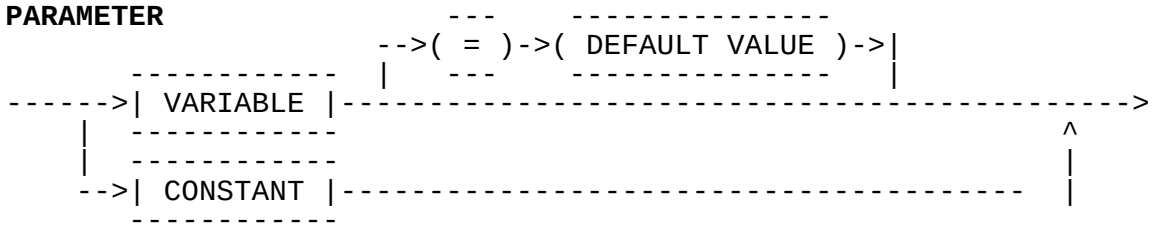
- SHOWTEXT to display text labels
- SHOWPOINT to symbolize points and place symbols inside areas
- SHOWLINE to symbolize lines and borders of areas
- SHOWAREA to symbolize areas
- CALLSYMPROC to call conditional symbology procedures

Symbology instructions are composed of symbology command words. Symbology command words are machine readable orders, which can be decoded in a straight forward manner to low level graphic actions e.g. an action like "fill an area" or "draw a line". The general definition of a symbology command word in Backus-Naur form is:




Symbology command words have parameters. The Backus-Naur definition above shows that such a command word can have more than one parameter separated by a comma. There are two types of parameters: constants and variables. Constant parameters pass fixed values like a colour or a line width on to the ECDIS Display Generator which then "knows" e.g. which colour to use to fill an area or which width to use to draw a line. A constant parameter may also be the name of a symbol that the ECDIS Display Generator then can look for in the symbol library.

Variable parameters are the six character codes of S-57 attributes. This is a very powerful construction. For example, to rotate a "traffic arrow" symbol the name of the S-57 attribute that contains the traffic direction (ORIENT) is passed as rotation parameter of the "show pattern" command. The ECDIS Display Generator then searches in the SENC for the exact value of the ORIENT attribute of the respective object and rotates the arrow symbol by this value. Thus every time another object is shown by the command, different values from the attribute will be passed to the ECDIS Display Generator.



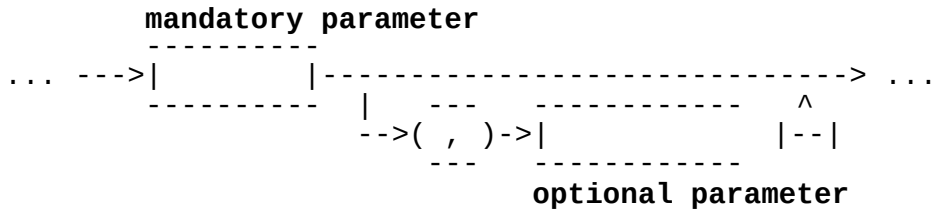

For example, «TSSLPT»,»ORIENT»,»SY(TSSLPT51,ORIENT) ...» means «orient symbol TSSLPT51 in the direction given by the value of attribute ORIENT.»

For variable parameters default values can be provided as a fail safe in case the attribute cannot be found in the feature object description. This can be done by assigning a default value to the parameter e.g. ORIENT='90.0'. The assignment is done within the parameter list of the command word.

A default value is assumed by the Display Generator if a parameter is optional (does not have to be passed). Thus the default value is given in the documentation where the command word is described and it must be encoded in the Display Generator. For an example, see the TRANSPARENCY parameter of the SHOWAREA instruction (section 7.4.6).

The symbology command must be terminated, if a parameter is mandatory (has to be passed) and no value is assigned to it either because a constant is missed from the parameter list or an attribute value cannot be found (attribute is missed from the object definition and no default value was assigned). Note that this does not necessarily mean that the whole symbology instruction is terminated since it may be composed of more than one command word e.g. the first command word in a symbology instruction shows a light flare and the second shows a buoy symbol. If the first command fails the second is still performed and the buoy is shown in the chart.

Whether a parameter is optional or mandatory can be seen from the Backus-Naur diagram of the command word:




The following sections explain the symbology instructions.

## 7.1 Symbology Instruction for Text Labels

The text instruction was designed to provide a suitable text placement for ECDIS. It is used to label point, line and area objects.

Text labels are treated as individual symbols, which are not part of the symbol library but part of the S-57 data itself(value of Attribute 'OBJNAM' etc.). Thus text instructions do not call a certain symbol, complex line style or fill pattern but the respective text string within the definition of a feature object or cartographic object.

Note that the Presentation Library does not provide a machine readable version of a font, because there are copyrights on fonts. Manufacturers should purchase a font on their own. For ECDIS presentation, a plain sans serif, non italic font should be used. Other fonts should not be used.

Please also note, that sounding objects are not symbolized as text labels. The Presentation Library provides a set of symbols that were designed to present soundings. See section 12 for the diagram of the conditional symbology procedure "SNDFRM02". Similarly, some abbreviations such as the "DW" and "IT" used in traffic routing areas are treated as symbols.

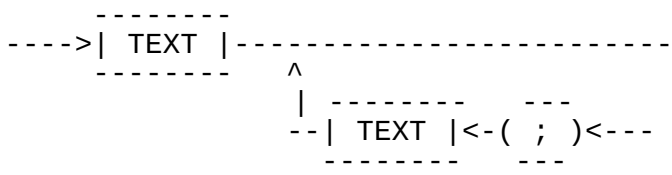
### 7.1.1 Rotation & Positioning of Text Labels

Text is not rotated. The pivot-point for text for an area object is the centre of the area. The pivot-point for text for a line is the centre of a single segment line. For a multi-segment-line the pivot-point is the mid-point of the run-length of the line.

If the text string is truncated by the ECDIS window, it can be left truncated, or alternatively it need not be drawn. If it relates to an object ahead of the ship, the display refresh will eventually permit a full draw.

### 7.1.2 Syntax of the SHOWTEXT Instruction

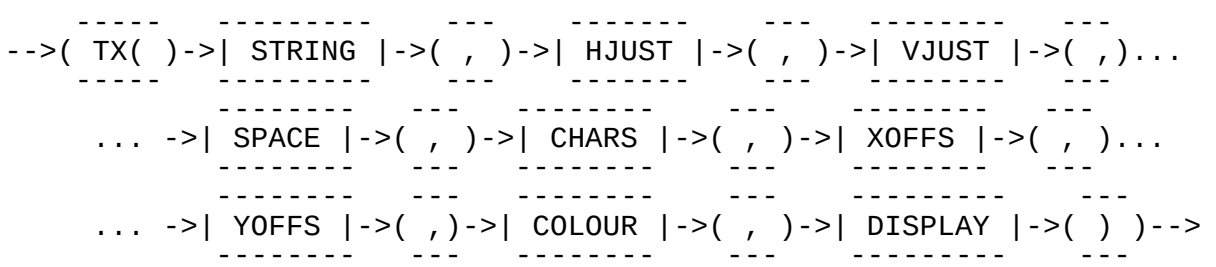
**SHOWTEXT** instruction (usage: point, line, area objects)




**7.1.2.1 TEXT** "show text" command word:

Two text command words are used:

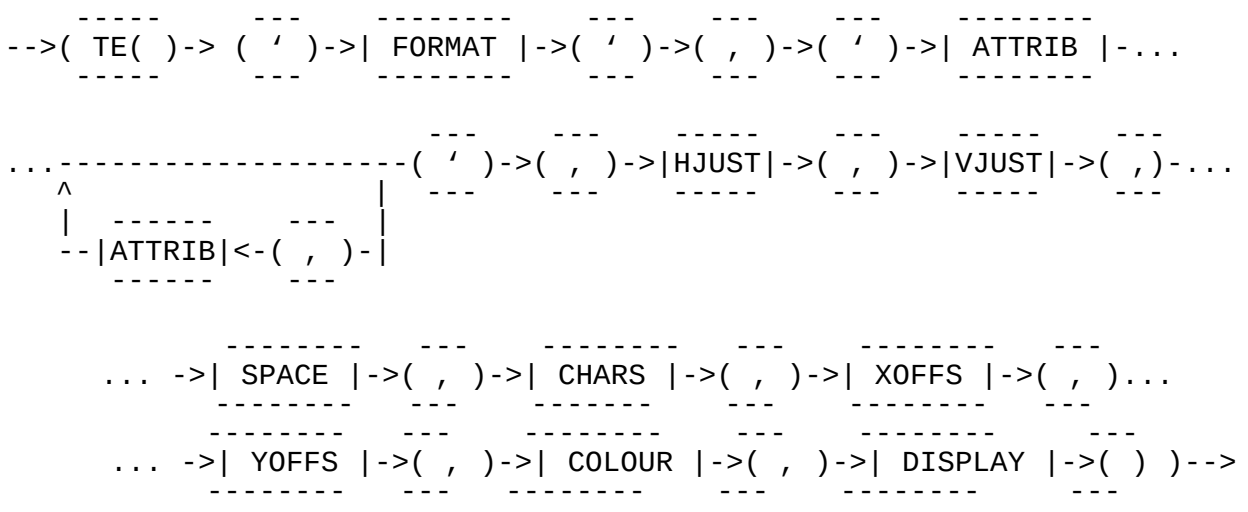
(1.) For purely alphanumeric text, the «TX» command:




(2.) For numeric text, an alphanumeric prefix or suffix is needed to avoid confusion between the numbers of the text and the numbers representing soundings. For this purpose the »C« format «TE» command is used. This substitutes «format» and «attribute list» parameters for the «string» parameter, but is otherwise the same as the «TX» command word:

Where '/n' is used in a «TE» command, each successive line should have the same justification (HJUST,VJUST) as the first line.

Section 7.1.4 describes how «TE» commands are handled in the look-up table.



#### 7.1.2.2 Parameters

**STRING** "text string" parameter:

The STRING parameter passes a text string that shall appear on the ECDIS screen.

Note: the six character acronym of a S-57 attribute (e.g. ,LITVES, OBJNAM) can be passed as STRING parameter; if the attribute is either of enumeration type or list type (e.g. COLOUR), the enumeration value shall be converted into the respective text string from the attribute definition in the object catalogue; if the attribute is of a numerical type, just convert the attribute value to a string. In the case that the text originates in an L-type attribute (e.g. SBDARE, NATSUR) the text equivalent of the listed attribute values should be written sequentially separated by a space with no punctuation marks.

**HJUST** "horizontal justification" parameter:

'1' means CENTRE justified
(i.e. pivot point is located at the centre of the overall length of text string)
'2' means RIGHT justified
(i.e. pivot point is located at the right side of the last character of text string)
'3' means LEFT justified. This is the default value.
(i.e. pivot point is located at the left side of the first character of text string)

**VJUST** "vertical justification" parameter:

'1' means BOTTOM justified. This is the default value.
(i.e. the pivot point is located at the bottom line of the text string)
'2' means CENTRE justified
(i.e. the pivot point is located at the centre line of the text string)
'3' means TOP justified
(i.e. the pivot point is located at the top line of the text string)

**SPACE** "character spacing" parameter:

'1' means FIT spacing
(i.e. the text string should be expanded or condensed to fit between the first and the last position in a spatial object)
'2' means STANDARD spacing. This is the default value.
(i.e. the standard spacing in accordance with the typeface given in CHARS should be used)
'3' means STANDARD spacing with word wrap
(i.e. the standard spacing in accordance with the typeface given in CHARS should be used; text longer than 8 characters should be broken into separate lines)

**CHARS** "Character Specification" parameter:

the CHARS parameter defines style (font), weight, width (upright/italic), and size of the text characters:

STYLE
"1" a plain, sans serif font should be used.

WEIGHT
4 means "light"
5 means "medium". This is the default value.
6 means "bold"

WIDTH
"1" means upright i.e. non-italic, ENC $CHARS attributes using "2" for width should be converted to "1".

BODY SIZE
This given in pica points (1 point = 0.351 mm) that specify the height of an uppercase character. The smallest size to be used is pica 10, and this is also the default size. Larger sizes may be used.

**XOFFS** "x-offset" parameter:

defines the X-offset of the pivot point given in units of BODY SIZE (see CHARS parameter) relative to the location of the spatial object (0 is default if XOFFS is not given or undefined); positive x-offset extends to the right (the "units of BODYSIZE" means that if for example, the body size is 10 pica points each unit of offset is 10 (0.351) = 3.51 mm).

**YOFFS** "y-offset" parameter:

defines the y-offset of the pivot point given in units of BODY SIZE (see CHARS parameter) relative to the location of the spatial object (0 is default if YOFFS is not given or undefined); positive y-offset extends downwards.

**COLOUR** "text colour" parameter:

colour token as described in section 4 and 13.

**DISPLAY** "Text display" parameter:

define text groupings for selection by the mariner.

### 7.1.3 Display of Text

#### 7.1.3.1 Text Groupings

**The display of text should be controlled independently of the display of the object it applies to. The mariner should have full control over the display of text. All text is in the IMO Category "Other Information".**

Text is in colour black, to give best readability under all light conditions.
Text should only be displayed when the object it applies to is displayed.
Text should always have display priority 8, to ensure it is readable, independent of the object it applies to.

As a guide to organizing the display of text, the last two digits of the SHOWTEXT instruction give a text classification that distinguishes between "Important" and "Other" text, and gives further suggested text groupings. The manufacturer should provide at least the capability to select "Important Text" and/or "Other Text", and he may provide further text groupings if he so wishes.

The text groupings are given in section 13.3

#### 7.1.3.2 Abbreviations

The abbreviation used on the ECDIS display are listed in Section 13.4.

Note that a few abbreviations, such as «DW» for deep water route and «IT» for inshore traffic zone, are used as symbols; these are explained in the relevant sections of ECDIS Chart1.

### 7.1.4 How text is handled in the look-up table

The existence of an attribute in a text command means that the command should be implemented whenever that attribute exists, with a value, in the SENC object being symbolized. (But, remermber that text is only written when selected by the mariner.)

If the attribute named in a text command is not included in the SENC object, the text command should be disregarded.

### 7.1.5 Examples:

«BUAARE»,»AC(CHBRN);TX(OBJNAM,1,2,3,'15110',0,0,CHBLK,26)

Writes the name of the built up area.

«BOYCAR»,»CATCAM4»,»SY(BOYCAR04);TE('by %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)

Writes the name or number of the buoy above and to the left, clear of fog signals, retro-reflectors etc., with a prefix «by» to distinguish a buoy number from a sounding.

«BRIDGE»,»CATBRG2 VERCCL VERCOP«,» SY(BRIDGE01);TE('clr cl %2.1lf\nclr op %2.1lf', 'VERCCL ,VERCOP',3,1,2,'15110',1,0,CHBLK,11);LS(SOLD,5,CHGRD)»

Writes, e.g., «clr cl 16.2» to the right of the «opening bridge» symbol with prefixes to explain the
clr op 17.8»
clearance and prevent any confusion with soundings.

## 7.2 Symbology Instruction for Point Objects

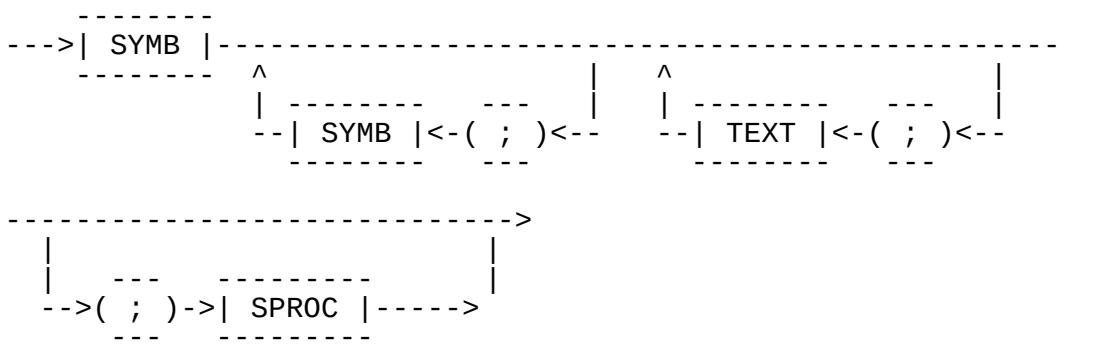
The SHOWPOINT instruction was designed to symbolize point objects. It gets a symbol from the symbol library, places the pivot point of the symbol (see 5.1) or text at the object's position, rotates the symbol if necessary and then displays symbol or text. Note that SHOWPOINT can handle more than one symbol and text at a time.

The Presentation Library provides look-up tables for simplified point symbols (intended primarily to provide smaller but more prominent buoy and beacon symbols, symbolized by function - lateral buoy etc.) and paper chart symbols (intended to convey shape).

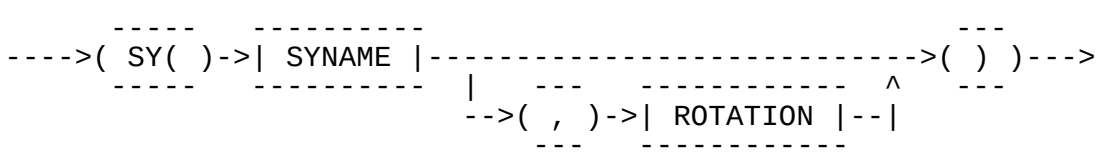
The mariner should be given the option of choosing paper-chart or simplified symbols.

### 7.2.1 Syntax of the SHOWPOINT Instruction

**SHOWPOINT** instruction (usage: point objects)




### 7.2.2 SYMB "show symbol" command word:




### 7.2.3 Parameters

**SYNAME** "symbol name" parameter:

The symbol name is an 8 letter-code that is composed of a class code (6 letters) and a serial number (2 letters).

**ROTATION** "symbol rotation" parameter:

0 to 360 nautical degrees (clockwise, starting North);
default value: 0 degrees;
Note: the symbol should be rotated about its pivot point; the six character code of an S-57 attribute can be passed as ROTATION parameter.

### 7.2.4 Examples:

SY(BOYCAR01);SY(LIGHTS05,135) :

shows symbols 'BOYCAR01' and 'LIGHTS05' at the same location in the given sequence, rotate symbol 'LIGHTS05' by 135 degrees from upright.

## 7.3 Symbology Instruction for Line Objects

#### 7.3.1.1 (Details of the above)

The SHOWLINE instruction was designed to symbolize line objects. It is also used within the SHOWAREA instruction to symbolize area boundaries. It uses a simple or complex line-style (see below) and may add a symbol or text.. Note that SHOWLINE can handle more than one line-style at a time.

#### 7.3.1.2 (Details of the above)

The pivot point of symbols or text should be the midpoint of the run-length of the line. If the symbol or text is truncated by the display window, it may be removed or it may remain truncated until screen refresh removes the problem.

#### 7.3.2.1 Line Styles

There are two types of line styles available: simple line styles and complex line styles. Complex line styles are composed from repeating symbols. A complex line style is transferred in a special line style module (see 10.7).

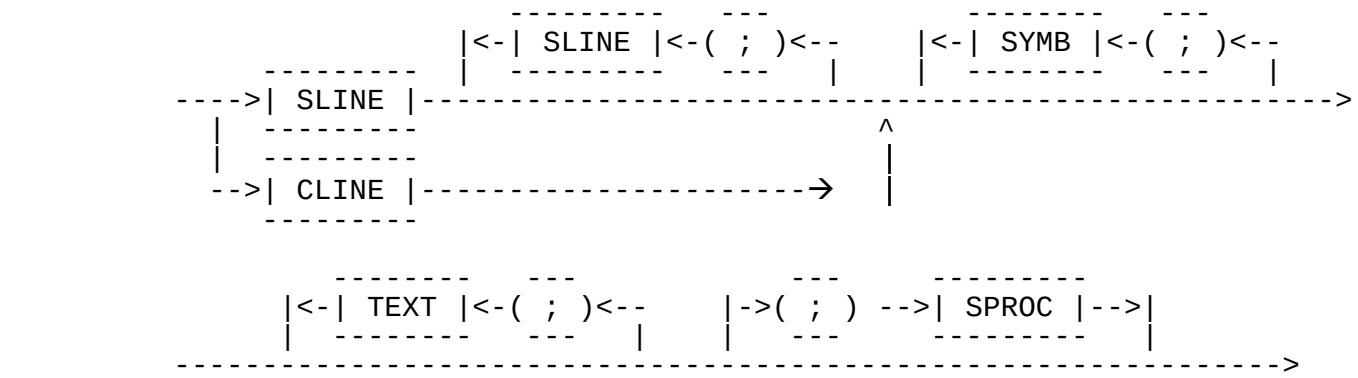
Simple line-styles are used to allow for a variety of basic line-styles without having them defined in the format of complex line-styles. Simple line-styles are based on a solid, dashed or dotted line that can be modified in width and colour. Because of their simplicity they can be 'hard'-coded in the ECDIS software and do not have to be transferred in a machine readable format. See 7.3.3 for simple linestyles.

#### 7.3.2.2 Line Width

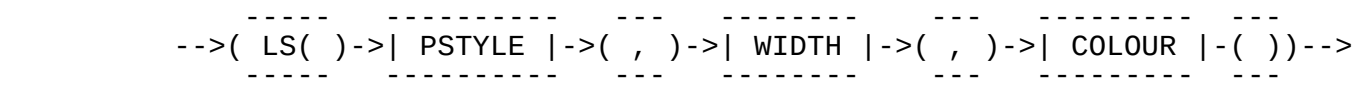
The line-width is given in units of the line-spacing (pixel size) specified in section 9 of S-52. This is currently 0.32 mm. If the pixel-diameter or line-spacing is grossly smaller, the line-width should be compensated by drawing the line in an appropriate width. If possible the "Display Generator" should smooth line ends with a width of more than 0.6 mm. Note that the given width of a line should never contain fewer pixels than at the standard display size and resolution specified in S-52 Appendix 2 section 5.

### 7.3.3 Syntax of the SHOWLINE Instruction

**SHOWLINE** instruction (usage: line objects)




### 7.3.4 SLINE "show simple line style" command word:




### 7.3.5 Parameters

**PSTYLE** "predefined line style" parameter:

```
'SOLD'  (_________)
'DASH'  (- - - - -) dash: 3.6 mm; space: 1.8 mm
'DOTT'  (.........) dott: 0.6 mm; space: 1.2 mm
```

**WIDTH** "line spacing" parameter:

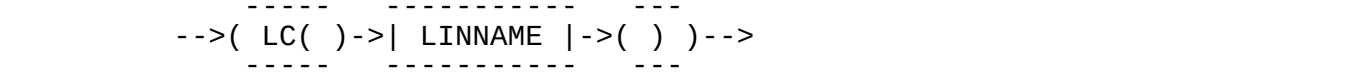
'1' x 0.32 mm <= WIDTH <= '8' x 0.32 mm;

line width is given in units of 0.32 mm pixel diameter or whatever size is required in section 9 of S-52.

**COLOUR** "line colour" parameter:

colour token as described in section 4 and 13.

**CLINE** "complex line style" command word:



**LINNAME** "line-style name" parameter:

The line-style name is an 8 letter-code that is composed from an object class code and a serial number (2 letters).

### 7.3.6 Examples:

LS(DASH,2,CHMGD)

dashed line in "chart magenta, dominant", 0.6 mm (2 x 0.3 mm) width.

LC(ACHARE51)

complex line-style defined for borders of anchorage areas.

## 7.4 Symbology Instruction for Area Objects

The SHOWAREA instruction was designed to symbolize area objects. It performs a variety of fill operations. The prime requirement is that the area symbolization should always be clearly visible in the part of the area that lies within the viewing window of the ECDIS. If the area covers a large part of the viewing window, more than one symbol may be required. On the other hand, a secondary requirement is not to show more symbols than necessary, as this will cause distracting clutter. One solution is to centre a symbol in the part of the area exposed by the viewing window. Eventually, dynamic fill patterns whose density varies according to the size and shape of the area should be developed.

### 7.4.1 Fill Operations

An area can be identified in several ways:

- with an opaque colour fill (e.g. depth areas);
- with a transparent colour fill (e.g. traffic separation zone);
- with a pattern of symbols (e.g. traffic arrows) or texture (e.g. packice)
- with a symbol or text located on a position inside the area (e.g. traffic arrow)

A transparent colour fill may overlap an opaque fill and a patterned fill may overlap any other fill, including another patterned fill. For overlapping fills the respective area has to be filled more than once in a sequence of several area-fill operations.

### 7.4.2 Transparent Fill

A transparent fill can be achieved in two ways:

1.) with only a percentage of the pixels having the fill colour (stippled fill);
2.) by mixing the fill and underlying colour at each pixel, according to the fill percentage.

Since the second method is not easy to achieve and needs a true colour graphic, the simulation of real transparency by the first method is supported by the Presentation Library. That means e.g. if an area of 4 by 4 pixels has to be filled with a transparent colour only 3, 2 or 1 pixel(s) of this area are tinted with the opaque fill colour while the remaining pixel(s) are tinted using the colour 'TRNSP' (= 100% transparent, see 4.2.1), which means the colour fill is not performed for these pixels. Thus the colour of the underlying pixels

still can be seen through. On a high resolution screen the result will be very close to a real transparent fill. The following explains the pseudo-transparency that can be achieved by this method:

* = pixel tinted in fill colour

O = pixel tinted in TRNSP (transparent)

| | |
|---|---|
| * | * |
| * | * |

opaque fill with 0% transparancey

transparency parameter = 0

| | |
|---|---|
| * | * |
| * | O |

25% transparency

Transparency parameter = 1

| | |
|---|---|
| * | O |
| O | * |

50% transparency

transparency parameter = 2

| | |
|---|---|
| * | O |
| O | O |

75% transparency

Transparency parameter = 3

Because it is very likely that most of the ECDIS systems do a transparent fill with this technique only the 25%, 50% and 75% percentages for the transparency are used within the presentation library.

### 7.4.3 Area Symbolization by a centred Symbol

#### 7.4.3.1 Introduction

Centred symbols are used to reduce clutter in areas of heavy traffic. Since such areas may be large we use large symbols and since many restrictions may apply to a given area (e.g. traffic lane; precautionary area; no anchoring or fishing) the symbols have built-in offsets to prevent overwriting (see figure 4a).

#### 7.4.3.2 Positioning centred symbols and text

A pivot point for centred symbols and text should be at the centre of the area, or close enough to the centre that it is evident which area the symbol applies to. The offsets for symbols and text are given with respect to the pivot point.

Multiple centred symbols are often used. For example, a traffic lane with restrictions on entry and on fishing will have a centred traffic arrow and an offset «entry restricted» symbol with a subscript «!» to indicate that other restrictions apply.

If, due to an offset built in by the Presentation Library, a symbol falls outside the area it applies to, it should not be drawn. Text may be allowed to extend beyond the boundary. The result should be that the mariner can clearly identify the area.

**Fig. 4a - Centred symbol**

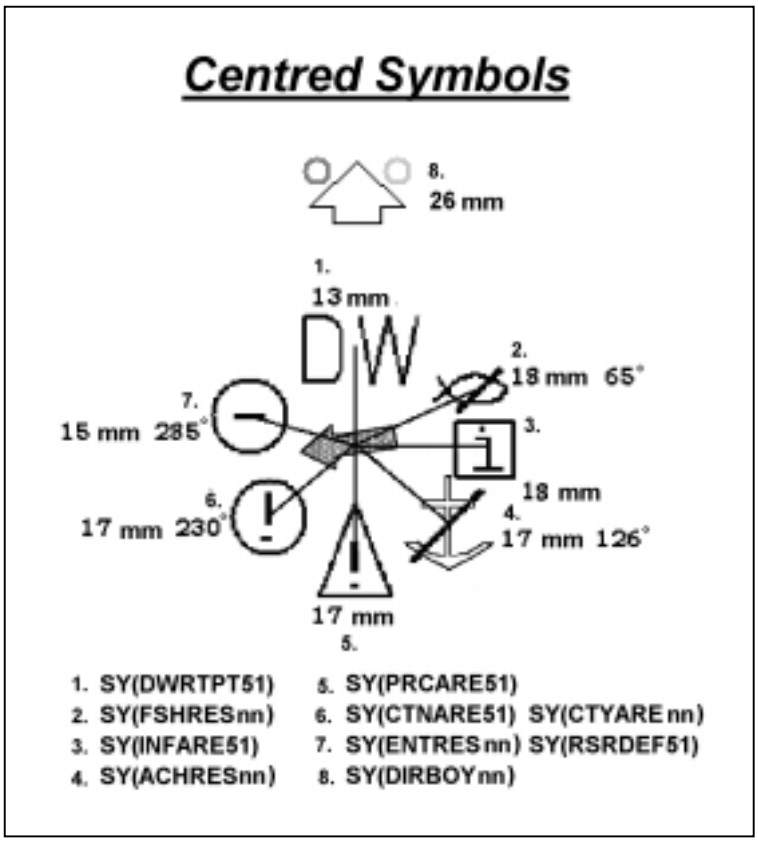
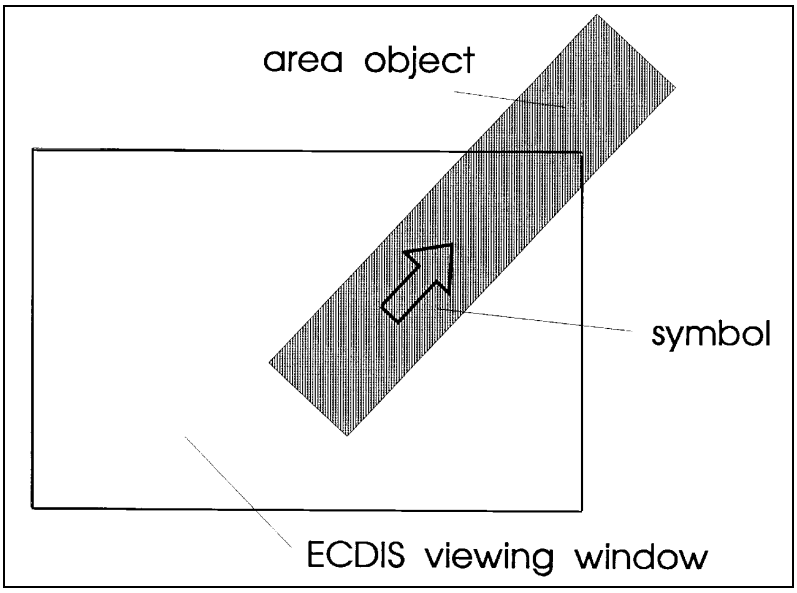



**Fig. 4b - Centred symbol**



A centred symbol should remain within the area even when the border of the display progressively truncates the area at each chart re-draw. If this is done by repeatedly re-calculating the centre of gravity (c of G) of the area, make sure the symbol remains within the area if this should be concave (e.g. L shaped, or a disc). One method of doing this if the c of g falls outside the area is to subdivide the area by the x,y coordinates of the calculated c of g then recalculate the component areas recursively until a point within the object is found.

### 7.4.3.3 Centred symbols on a ship-centred display

Some ECDIS draw a true-motion display which is updated frequently enough to keep own-ship close to the centre. If, when using this display mode, the situation arises that the display window lies completely within an area which is symbolised by centred symbols, these symbols will draw close to or under the own-ship symbol (having lower display priority) and will cause clutter and confusion. It is the responsibility of a manufacturer who uses a ship-centred display to avoid this potentially dangerous situation by keeping any centred area symbols at least 20 mm from the own-ship symbol.

### 7.4.3.4 Calculating the centre of gravity (c of g)

An understanding of the underlying mathematics can be found in books on computer graphics. The following equations for c of g were derived by a Stokes' Theorem transformation of the appropriate surface integrals to line integrals around the boundary:

$$Area\ A = 1/2 \sum_{i=1}^{n} (X_i Y_{i+1} - X_{i+1} Y_i), \qquad \overline{X} = 1/6A \sum_{i=1}^{n} (X_i + X_{i+1})(X_i Y_{i+1} - X_{i+1} Y_i),$$

$$\overline{Y} = 1/6A \sum_{i=1}^{n} (Y_i + Y_{i+1})(X_i Y_{i+1} - X_{i+1} Y_i),$$

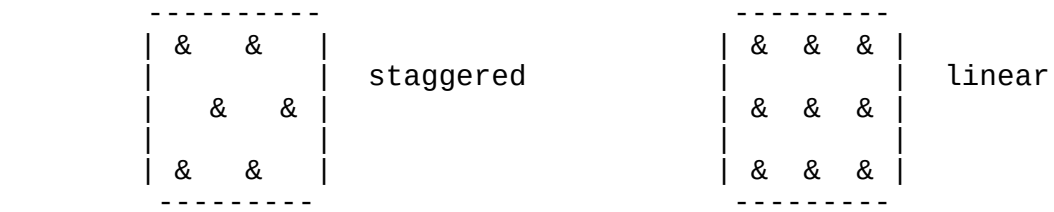
(J.K. Hall in Computers & Geosciences Vol pp. 203-205 Pergamon Press 1976)

### 7.4.4 Fill Patterns & Textures for areas

Fill patterns use widely spaced symbols, as for example for a prohibited area. Textures consist of continuous shapes such as the dots of a dredged area or the diamond pattern that highlights water of depth less than the safety contour at night.

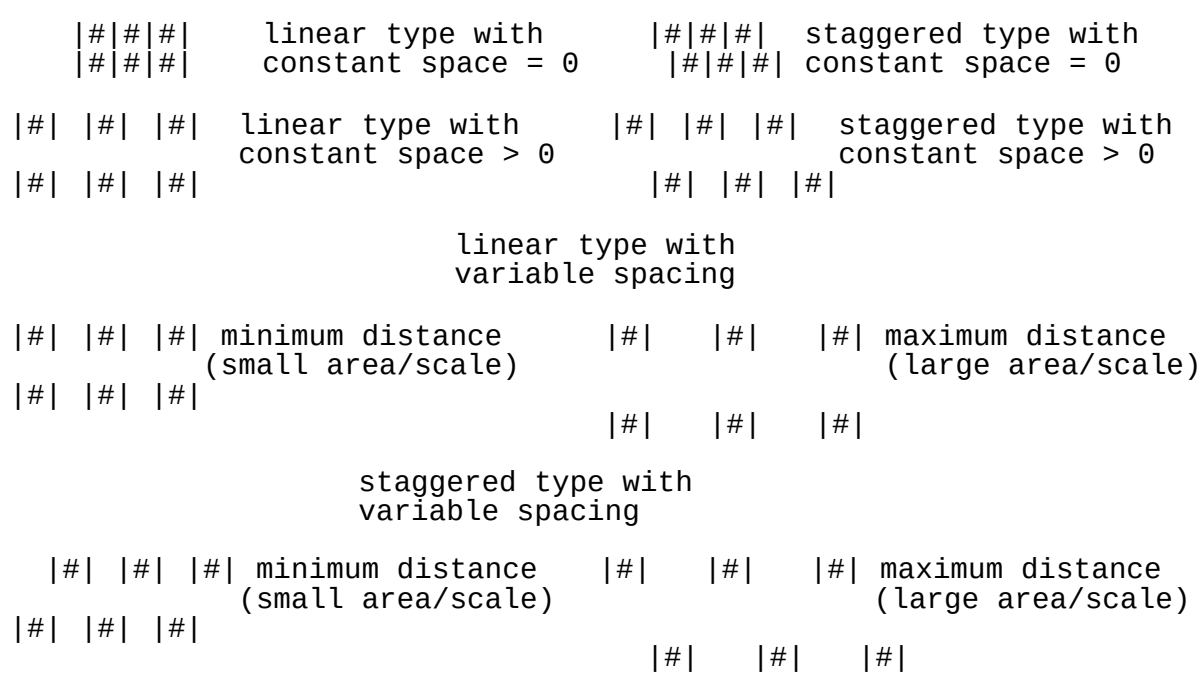
The form of a pattern symbol or texture unit may be described by a pixel array or vector description (see section 5 for further details).

Fill patterns may be either staggered or linear:




Ideally the symbols of a pattern fill should be closer together for a small or thin area, to ensure enough symbols are seen, and farther apart for a large area, to avoid clutter. But until simple, proven algorithms for variable symbol spacing are developed, the Presentation Library will use fixed spacing.

The pattern type and the symbol spacing gives full control over a set of variations (|#| represents the pattern symbol):




The vertical and horizontal distance between pattern symbols is given in the pattern definition (see section 10.5). This distance is the space between symbol covers, the symbol cover is calculated by taking the symbol's bounding box and expanding it to include the pivot point. This mechanism allows the pivot point to be used for fine adjustments to symbol spacing.

The position where an area fill with a pattern symbol is started should preferably be based on a geographical position and not on an edge of the screen. If the fill pattern was based on an edge of the screen the pattern symbols would not stay on the same position of the chart while the picture was moving underneath in centred mode. Also do not base a fill pattern on the edge of the area to be filled. This will result in a strange looking pattern fill when two adjacent areas are filled by the same pattern.

An area pattern which is described in the written «Description of Symbols» of the symbol library as a «pattern of symbols» (e.g., FSHHAV02) may be substituted by a single centred symbol. However, this should never be done with an area texture (pattern of symbols, e.g., NODATA03, RCKLDG01, TSSJCT02, etc.)

### 7.4.5 Area Boundaries

#### 7.4.5.1 Plain and Symbolized Boundaries

The Presentation Library provides look-up tables for plain area boundaries (intended for use at small scale to reduce clutter) and symbolized area boundaries (intended for use at very large scale to show immediately on which side of the boundary the area lies and to identify the area). Note that centred area symbols should still be used with symbolized boundaries to symbolize the case when the entire display window lies within an area.

The mariner should be given the option of using plain or symbolized boundaries. See also section 5.2 about the limitations of symbolized linestyles on curved boundaries.

#### 7.4.5.2 Masked Lines

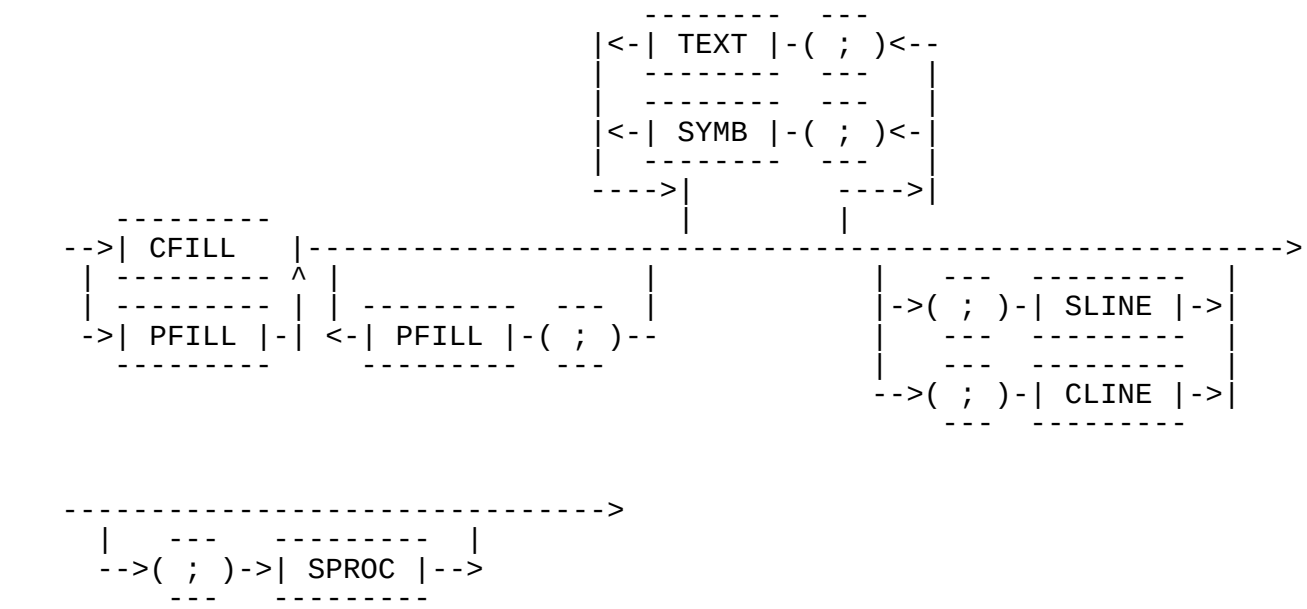
Masked lines (MASK subfield of FSPT field set to {1}) should not be drawn

#### 7.4.5.3 (Details of the above)

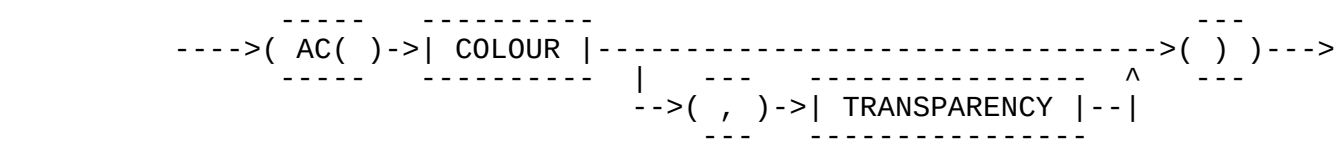
Note that if an area is filled with a colour or a pattern the borders must be included in the fill as well. This generates an image without gaps between neighbouring areas. It is also important for a perfect fit of adjacent cells. If the borders of the area are to be distinguished from the area's fill, the borders have to be re-drawn on top of the fill. This is forced when a SHOWLINE instruction (see 7.3.4) is called within a SHOWAREA instruction. The SHOWLINE instruction then performs the presentation of the border.

### 7.4.6 Syntax of the SHOWAREA Instruction

**SHOWAREA** instruction (usage: area objects)



### 7.4.7 CFILL 'colour fill' command word




### 7.4.8 Parameters

**COLOUR** "area colour" parameter: colour token as described in section 4 and 13.

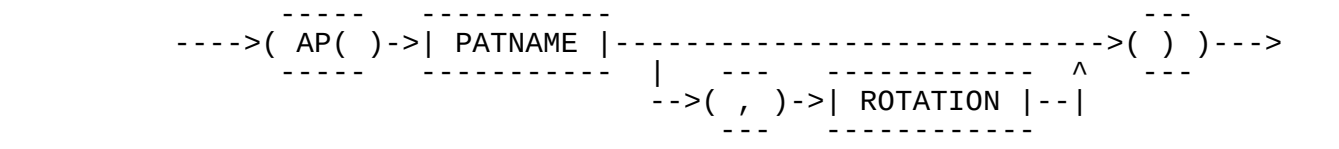
**TRANSPARENCY** "area transparency" parameter:

0 opaque (= default value)
1 25 % (3 of 4 pixels use COLOUR, 1 uses TRNSP)
2 50 % (2 of 4 pixels use COLOUR, 2 use TRNSP)
3 75 % (1 of 4 pixels use COLOUR, 3 use TRNSP)

Note: the TRANSPARENCY parameter is an optional part of the colour fill command; if it is not included, the command defaults to opaque fill.

Example: AC(CHMGF,3) means 25% magenta, 75% TRNSP

**PFILL** "pattern fill" command word:




**PATNAME** "pattern symbol name" parameter:

The pattern symbol name is an 8 letter-code which is composed of a class code (6 letters) and a serial number (2 letters).

**ROTATION** "pattern symbol rotation" parameter:

0 to 360 nautical degrees (clockwise, starting North);
default: 0 degree;

Note: the ROTATION parameter is optional; if a raster symbol is called the ROTATION parameter is ignored; the six character code of an S-57 attribute can be passed as ROTATION parameter.

The rotation function would operate on individual symbols of the pattern and not on the pattern as a whole. It is not in use at present.

### 7.4.9 Examples:

AC(CHBRN,0) or AC(CHBRN)

area filled with opaque colour 'chart brown'

AP(DQUALA21);LS(DASH,2,CHGRD)

area filled with pattern for 'category of zone of confidence in bathymetry', no symbol rotation; bordered by a dashed line in 'chart grey , dominant', 0.6 mm width

SY(TSSLPT51,ORIENT);SY(DWRTPT02);CS(RESTRN01)

area with oriented centred traffic arrow; offset centred symbol «DW» symbol; and with whatever restriction symbol is required by conditional symbology procedure RESTRN01.

## 7.5 Calls to Conditional Symbology Procedures

**7.5.1** The CALLSYMPROC instruction was designed to call a conditional symbology procedure.

This call is used in two ways:

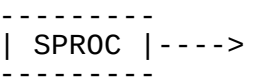
(1.) As the sole instruction in field 3 of the look-up table.
In this case it does the symbolization and may change the values given in the look-up table (for the succeeding fields of that line, e.g., «LIGHTS», «CS(LIGHTS05)», «8», «O», «STANDARD», «27070».

(2) As the last command in a symbolization instruction.
In this case it may change the values in the succeeding fields of that line, as in case 1. In addition, it may add to or amend the symbolization instructions already given in the same field, e.g., «ACHARE», «», «SY(ACHARE51); LC(ACHARE51); CS(RESTRN01); «3», «S», «STANDARD», «26220»

The placing of the CALLSYMPROC is shown in the Backus-Naur diagrams for the SHOWPOINT, SHOWLINE and SHOWAREA instructions.

### 7.5.2 Syntax of a Call to a Conditional Symbology Procedure

**CALLSYMPROC** instruction (usage: point, line, area objects)




**SPROC** "symbology procedure call" command word:

**PROCNAME** "symbology procedure name" parameter:

Conditional symbology procedures are named by the object class that is interpreted by the procedure. The name is an 8 letter-code that is composed of the class code (6 letters) and a serial number (2 letters)

**Example**:

CS(DEPARE01)

The symbology procedure no. 01 for objects of the class 'DEPARE' (depth area) is called.

## 8. SOME DETAILS FOR THE DESIGNER OF THE ECDIS DISPLAY GENERATOR

This section gives program designers some hints which details have to be taken into account while designing an ECDIS Display Generator. It will be amended as feedback from program designers will accumulate. It is recommended that designers study S-57 before reading this section since S-57 terminology and references to S-57 are used to wide extent.

### 8.1 Data Consistency Requirements

The quality of the presentation depends very much on the consistency of the data with respect to S-57. Thus ECDIS manufacturers should be aware of the consistency of the data that will be processed by their ECDIS Display Generator. Some criteria that are important:

**8.1.1 (Details of the above)** - Feature objects must be of an officially adopted object class. If feature objects are of proprietary (non-IHO) classes they will be treated as members of unknown object classes. Thus there will be no appropriate entry in the look-up tables and they cannot be presented on the ECDIS screen. Instead there should be a message on the interface and the unknown objects should show up as '?'-symbols.

**8.1.2 (Details of the above)** - All polygons within the data set should be properly closed. This is especially important for group 1 of objects within a S-57 data set . This group contains all area objects that represent the natural surface of the earth (depth areas, , land areas etc.). If polygons of group 1 objects are not properly closed, some of the conditional symbology procedures will fail.

**8.1.3 (Details of the above)** - In order to avoid ambiguous situations for the conditional symbology procedures, no area objects of group 1 may overlap each other. For example, a symbology procedure that processes underwater hazards must be capable of detecting whether e.g. an obstruction is located within a safe water area or not. If adjacent areas of group 1 overlap each other the depth information will be ambiguous.

**8.1.4 (Details of the above)** - In the perfect world, all mandatory attributes required by S-57 Appendix B1 «ENC Specification» would be populated, except for cases where S-57 Appendix B1 Annex A «Use of the Object Catalogue» deliberately codes by omission (e.g., clauses 5.8.2 and 10.2.1.1). In reality the data may not always be available and the producer will code the attribute but omit the value to indicate it is unknown.

The Presentation Library provides default symbolization for many cases of attribute value omitted (e.g., in the first line for every object class in the look-up table). However, it is impossible to foresee all potential problems, and the possibility exists that an omitted mandatory attribute or missing mandatory attribute value may cause processing to hang up,, and/or unpredicted symbolization.

## 8.2 Display Generator Requirements

To successfully use the Presentation Library make sure that the Display Generator is capable of:

- Detecting whether a point object is located inside or outside of any of the area objects of group 1 (earth's surface). Some conditional symbology procedures are based on this capability.
- Detecting whether two or more feature objects are referring to the same spatial object like an area, line or point. Duplicate spatial objects that are located at the same position and share the same extent (their coordinates are identical) should be treated as one. The relationship of a group of feature objects to one or a group of identical spatial objects is needed to derive the correct symbolization. For example, a depth contour and the two adjacent depth areas are referring to ("use") the same edge (or a set of identical edges) since the edge is part of the depth contour as well as part of the boundaries of the depth areas. Such a relationship should be derived from the data to allow for a decision by a conditional symbology procedure whether the contour is a safety contour.

## 8.3 How to use the Look-Up Tables

As a fail-safe measure, the first action in drawing the ECDIS display should be to cover the screen with grey NODTA colour fill together with fill pattern NODATA03. Display priority is 0, supressed by radar, category «displaybase», viewing group is 11050.

### 8.3.1 Items not in the look-up table

A few display requirements of the IMO Performance Standards and the IHO specifications cannot be handled by look-up tables. These are described in section 8.5.

### 8.3.2 Layout of the Look-Up tables

#### 8.3.2.1 (Details of the above)

The look-up tables specify how object classes are presented graphically on the ECDIS-screen. Each look-up table entry (i.e. look-up table line) contains six fields plus one optional (see section 11, for examples):

1. field - code of the object class
2. field - attribute combination
3. field - symbolization instruction
4. field - display priority
5. field - OVERRADAR flag
6. field - display category membership
7. field - optional viewing group

### 8.3.3 Matching to the look-up table

**8.3.3.1 (Details of the above)**

Note that look-up table lines of the same object class must be kept together and the order used in the Presentation Library must be preserved, in order to provide correct symbolization. The order of the attributes within a given line has no significance, but the order of the attribute values within a given attribute is significant (see 8.3.3.3).

**8.3.3.2 (Details of the above)**

To find the symbology instruction for a specific object, enter the look-up table with the object's class code and gather all lines that contain the class code in field 1. If only a single line is found, field 2 of that line shall be empty and the object is always shown with the same symbology regardless of its description.

**8.3.3.3 (Details of the above)**

If there is more than one line in the look-up table, search for the first line each of whose attribute values in field 2 can also be found in the attribute values of the object. If more than one attribute value is given in the look-up table, the match to the object must be exact, in order as well as content. For example, a look-up table attribute value 4,3,4 is not matched by object attribute values 3,4,3 or 4,3. However, the existence of further attribute values does not invalidate the match: in the above example object attribute values 4,3,4,7 would match the look-up table, (because value 7 is not used in symbolizing). Use the symbology instruction given by that line in field 3 to symbolize the object's geometry. If no look-up table line can be identified where all attribute values in field 2 match the object's attributes, select the symbology instruction from the first line that contains the object class code in field 1. Field 2 of this line shall be empty and field 3 shall contain a fail-safe generic symbolization instruction.

**8.3.3.4 (Details of the above)**

The rule in the paragraph above applies in the usual case when the look-up table contains specific values of the attribute in field 2. In this case fields 1 and 2 are of the general form: "OBJCLS", "ATTRBAi↓ATTRBBj↓", where attribute A value "i" and attribute B value "j" may be found in the SENC. Only values «i» and «j» will give a match.

Other forms of look-up table line may be used in certain cases:

(i) No value is given for the attribute value; the value is missing.
This look-up table line is of the form "OBJCLS", "ATTRBA↓".
It is used when the same symbolization is to be employed for all values of attribute A.
Any value of the attribute except «unknown» will give a match.

(ii) The placeholder »?» is given for the attribute value.
This look-up table line is of the form "OBJCLS", "ATTRBA?↓".
Only the attribute value=unknown (i.e., omitted in the data) will give a match in this case.
Example: "DEPARE","DRVAL1?↓DRVAL2?↓","AC(NODTA);AP(PRTSUR01)" etc., - which is the symbolization for an incompletely surveyed area.

(iii) There is one instance where S-57 uses the «omission» of a mandatory attribute (i.e., the mandatory attribute is not there, its code is omitted) to code a specific object: «TSSLPT»,»», where ORIENT is omitted, codes a traffic junction.

In every other case, the first look-up table line for each object class omits all attributes and is used to give the default symbolization.

Note: there are no spaces in any of these formats.

**8.3.3.5 (Details of the above)**

The line used for symbology instructions must also be used for display priority, over radar flag, IMO category and optional viewing group.

**8.3.3.6 (Details of the above)**

For some object classes the relation between attribute values and symbology instruction is too complex or the presentation depends on mariners' selection. Therefore a conditional symbology procedure is called in the "symbolization instruction"-field which in turn produces the symbology instructions for presentation and may modify the priority and/or the radar flag and/or IMO category and/or viewing group.

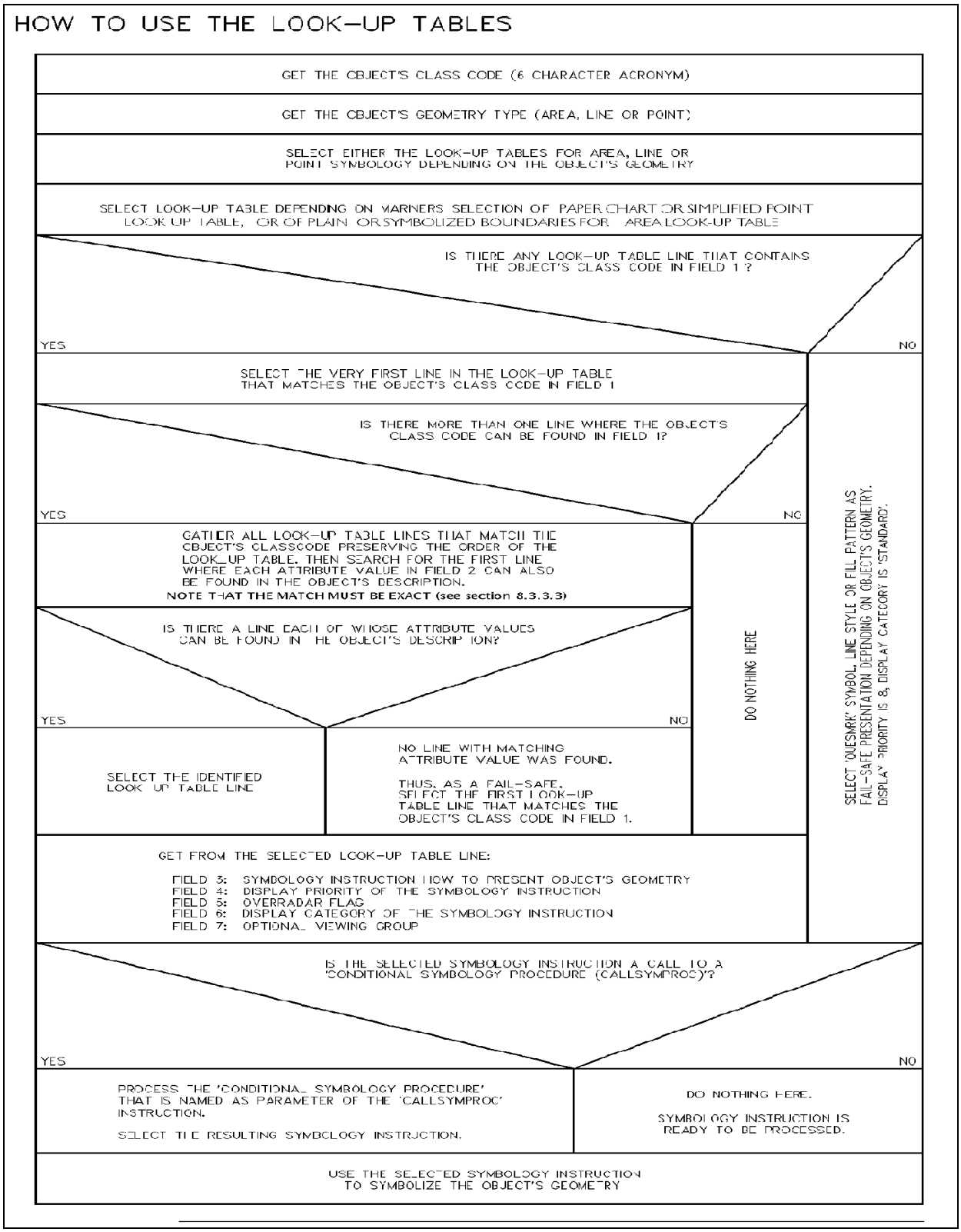
**8.3.3.7 Question mark symbolizes unidentified object**

If there is no look-up table line matching the object at all, the look-up table is incomplete or the object is of an unknown object class. If this happens, a caution should be shown on the mariners' interface and a '?'-symbol ('QUESMRK1'-symbol, pattern or line style) should be shown as fail-safe presentation which on cursor inquiry would read out and explain the object in the SENC. For an area use SY(QUESMRK1) as a centred symbol and LC(QUESMRK1) to symbolize the boundary

**8.3.3.8 (Details of the above)**

The following flow chart diagram explains in detail how to use the look-up tables.

**Fig. 5 - How to use the look-up tables**



**8.3.3.9 (Details of the above)**

The symbology instruction may refer to attributes that are not listed in field 2, for example CS(RESTRN01) or TX(OBJNAM...). If these attributes are not included in the SENC object, this particular command word should be passed over and the rest of the symbology instruction should be completed.

**8.3.3.10 'No symbol' - Objects**

In some cases the "symbolization instruction"-field (field 3) in a look-up table line is empty. Such an explicitly "empty" instruction means that no actual presentation for the respective object is required. Such objects are not symbolized and they are not shown on the screen. For example, an object of the class EXEZNE (exclusive economic zone) which covers the breadth of the territorial sea is not shown since it is an object of administrative meaning that would be read out only on cursor inquiry.

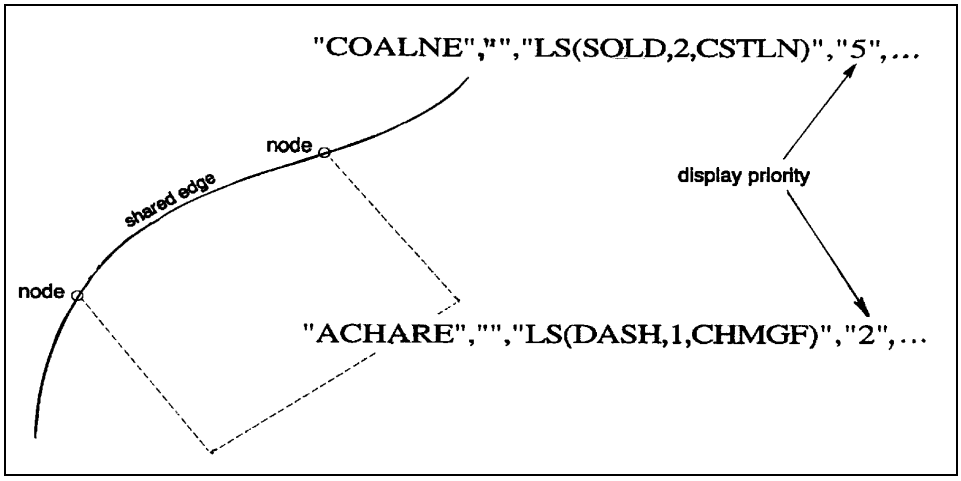
**8.3.4 Display Priority etc.**

**8.3.4.1 Display Priority**

Each symbolization instruction from a look-up table line has a display priority given in field 4. The display priority can be of a value between '0' and '9', where '9' identifies the highest priority. The display priority applies irrespective of whether an object is a point, line or area. If the display priority is equal among objects, line objects have to be drawn on top of area objects whereas point objects have to be drawn on top of both. If the display priority is still equal among objects of the same type of geometry (area, line or point) the given sequence in the data structure of the SENC, or some other neutral criterion, should be used for an arbitrary decision as to which object is drawn on top. Text should be drawn last (except for ownship etc.), in priority 8.

The display priority should be used to ensure that objects that overlap each other are drawn in the right sequence. Thus, an object with a higher priority should be drawn after (on top of) an object with a lower display priority. However, if two line objects, or two area boundaries, or a line and an area boundary, are located at the same position and share the same extent (their coordinates are identical), then the line symbolization with the highest display priority must suppress the symbolization of the other line object. Therefore only the symbolization of the line object of the higher display priority is drawn. Please study the following example:

**Fig. 6 - Symbolization of shared edges**




The coastline object is symbolized with a solid line while the anchorage area is bordered with a dashed line. Both objects share an edge that is part of the coastline. The symbolization of the coastline object suppresses the border of the anchorage area since the display priority of the coastline symbolization is higher. Note that priorities have to be evaluated again, if presentation scale changes (see 8.4).

Remember, this suppression only applies between line objects, which includes area boundaries. The rule for centred symbols, area patterns and point symbols is that all symbols should be drawn , with the highest priority object being drawn last independent of whether it be point, line or area.

There is one exception to this rule for suppressing overlapping lines. The manual chart correction lines LC(CHCRIDnn) and LC(CHCRDELn) should coexist with the underlying line. Both LC(CHCRIDnn) or LC(CHCRDELn) and the underlying line should be drawn.

Overdrawing may be essential, for example in that case of buoy, its name, its light flare. These are given offsets in the symbol library to avoid overwriting.

The following gives a general indication of how priorities are allocated. Within each group priorities are adjusted to meet specific cases:

| | |
|---|---|
| no data filled area pattern | priority 0 |
| S-57 group 1 filled areas | priority 1 |
| superimposed areas (e.g. CANALS) | priority 2, 3 |
| restricted areas | priority 5 |
| traffic areas | priority 6 |
| land features | priority 4, 5 |
| water features | priority 3, 4, 5, 6 |
| coastline features | priority 5, 6, 7 |
| routeing lines | priority 5, 6, 7 |
| symbols for lines and areas | priority 4, 5, 6 |
| hazards (bridge, safety contour) | priority 8 |
| mariners VRM & EBL | priority 9 |
| own ship | priority 9 |

Note that the display priorities for look-up table entries are provisional values that may change in the light of experience.

### 8.3.4.2 'Overradar' layer

Field 5 of the look-up table lines contain the OVERRADAR flag. It classifies whether objects are shown on top of the raw radar picture. Two different values can occur in this field:

'O' which puts the object's presentation over radar; and
'S' which means that presentation is suppressed by radar

Thus, OVERRADAR is similar to a display layer that assigns objects to the information shown on top of the raw radar picture. As a fail-safe, objects are automatically OVERRADAR if field 5 of a look-up table line is empty.

### 8.3.4.3 Display Categories

Every entry to the look-up table matches either all objects of an object class or a subset of objects. Therefore the look-up table can be used to assign the objects to the IMO Display Categories (see IMO Performance Standard for ECDIS (3) appendix 2).

The IMO "display categories" are as follows:

The Standard Display information is that part of the SENC which should be presented when the ECDIS display is first switched on, and at any time by a single operator action (see (3), Sections 2.1.4, 3.2, 3.3, 3.4).

The Display Base is that part of the Standard Display which should be permanently retained on the display (see (3), Sections 2.1.5 and 3.5).

Other information includes all SENC information that is not in the Standard Display, to be displayed on demand by the mariner.

Mariners objects

The own-ship symbol and planned route are required as Display base by the IMO Performance Standard. All other «non-standard object classes» are identified as «Mariners standard» or «Mariners Other». They should be displayed when the ECDIS is first switched on, and thereafter should follow the rule for whichever category the mariner assigns them to.

The following key words in field 6 are used to assign the look-up table entries to display categories:

| | |
|---|---|
| DISPLAYBASE | - assigns the object to the Display Base |
| STANDARD | - assigns the object to the Standard Display |
| OTHER | - assigns the object to Other Information |
| MARINERS STANDARD | - assigns the object to Standard Display, or which ever category the |
| MARINERS OTHER | mariner assigns them to |

#### 8.3.4.4 Viewing Groups

The mariner should have effective control over which features appear on the display (subject to the over-riding requirements of IMO category).

The viewing groups suggested in table 13.2 are intended as a framework on which the ECDIS manufacturer can base his own method of providing this capability.

An item in the viewing group table may be either a chart object, or a mariners' or other time-variable object, or a special symbol such as the "depth less than safety contour" pattern. Items are arranged in numbered groups (e.g. group 26230 consisting of the items pipeline area and cable area) which in turn are arranged in sets (e.g. set 26000 consisting of cautionary areas). The groups are arranged by IMO Category, in the sequence of INT 1 for the paper chart. Mariners are generally familiar with INT 1.

The viewing group suggested for each object is given in field 7 of the look-up table. The manufacturer may use the viewing group scheme or not, as he prefers. If he does use it, then in some cases a single item, such as soundings (33010) should probably be selectable. In other cases several groups from different sets may be combined. However groups from different IMO categories should not be combined.

Although the viewing groups reflect the IMO category, the authority for category is the classification in field 6 of the look-up table.

The Presentation Library provides a similar classification for text - see section 7.1.3
The viewing groups are listed in section 13, table 2.

#### 8.3.4.5 Display Priority & Display Category in Conditional Symbology Procedures

A conditional symbology procedure is called from the look-up tables (see 7.5). Thus the symbolization that is generated by the procedure has the display priority, OVERRADAR classification and display category which is given in field 4, 5 & 6 of the look-up table entry from which the procedure was called.

A conditional symbology procedure can assign the symbolization to another display category, put it on top of radar or give it a different display priority if necessary. Thus it 'overwrites' the default assignments given in the look-up table e.g. if a depth contour is identical with the safety contour the depth contour is assigned to the DISPLAYBASE category (see diagram 'DEPCNT02', section 12).

In the symbology procedure diagram the new assignment is given explicitly if the conditional symbology procedure overwrites the default look-up table assignments. The default assignments from the look-up tables are valid if there is no explicit assignment for display category, display priority or OVERRADAR.

### 8.3.5 Test Edition of the Presentation Library

IEC 61174 requires a "test edition" of the Presentation Library for testing the capability of updating the Presentation Library. This "test edition" is provided as a complete replacement .DAI file named PSLTmm_0.DAI, where mm is the edition number. The "test edition" look-up tables symbolize all areas as AC(NODTA), all lines as LS(DASH,1,CHGRF), all buoy objects with the square black CHKSYM symbol and all other point objects with their standard symbology.

## 8.4 Display of objects depending on date or on display scale

Some objects, such as seasonal buoys, are only to be displayed over a certain period (PERSTA to PEREND). Other objects, such as a traffic separation scheme, may have a date on which they are introduced (DATSTA) or discontinued (DATEND). Any object with one of the above attributes should not be displayed outside its effective dates (see figure 1).

(Edition 4 of the Presentation Library may specify that the mariner be given the option of requesting to display such objects for temporary review outside of their effective dates.)

Some objects (such as intermediate depth contours) may carry the attribute SCAMIN to specify the smallest display scale at which they should be drawn. At display scales smaller than SCAMIN the object should not be drawn, in order to avoid clutter. For example, an object with a SCAMIN value of 50,000, indicating a scale of 1/50,000, should not be drawn on an ECDIS display of 1/60,000.

## 8.5 Presentation Instructions which cannot be handled by look-up tables -IMO requirements

In some cases the Presentation Library does not provide a machine-readable symbology instruction in the look-up tables or flow chart of a conditional symbology procedure that specifies how to present a specific information on the ECDIS screen. The reason is, that such information cannot be clearly identified as an S-57 object class or it appears to be illogical to include it to the mariners' navigational object classes (see S-52 / Appendix 2 / Annex A / Part 2 for further details and definitions of the mariners' navigational object classes).

Therefore, the following presentation instructions are in free text in order to assist the manufacturer to set up a satisfactory and comprehensive ECDIS display. The manufacturer can achieve a correct presentation by handling these cases in his software individually. All symbols, line styles or fill pattern mentioned in the text are on the distribution CD-Rom. Note that this section will always be necessary, since nothing is perfect in our world.

### 8.5.1 Detecting the Safety Contour

IMO Performance Standards for ECDIS, A19/Res.817, requires in section 10.3.5 that "ECDIS should give an alarm if the ship, within a specified time set by the mariner, is going to cross the safety contour".

Note that the HO may not draw any contours round small isolated dangers. However conditional symbology procedure UDWHAZ03 identifies all rocks, wrecks and obstructions that require a safety contour, and the output of this procedure through calling procedures OBSTRN04 and WRECKS02 may be used in generating alarms. One object, LNDARE as a point (islet) or line (isthmus) is not covered by UDWHAZ03; it should be added to the safety contour detection process as a separate item.

### 8.5.2 Units of depths:

IMO PS Appendix 2, 1.7 requires that units of depth be part of the display base. Symbol UNITMTR1 or UNITFTH1 should be placed in the bottom left corner of the display, just inside the scalebar. Display priority 9: over radar; category display base, viewing group 11080.

### 8.5.3 Scalebar and latitude scale:

For display scales larger than 1/80,000 (e.g. a scale of 1/50,000) draw symbol 'SCALEB10' on the left side of the chart display (so that the mariner knows where to look for it), bottom justified and about 3mm in from the border of the display. Make sure the symbol is properly sized by your software to represent 1 mile (1852 m) at the scale of the display. For display scales of 1/80,000 or smaller (e.g. 1/250,000) use symbol 'SCALEB11', similarly located, and scaled to represent 10 miles at the scale of the display. For both symbols the display priority is 9, over radar, category display base, viewing group 11030.

### 8.5.4 North arrow:

Use symbol 'NORTHAR1' to indicate true north. Place it in the top left corner of the chart display, inside the scalebar. Rotate the symbol to true north if the display is other than north up, and make sure it is clear of the scalebar even if the latter extends the full height of the display. Display priority is 9; over radar; category display base, viewing group 11040.

### 8.5.5 Graticule:

If the ECDIS shows a graticule (IMO PS Appendix 2, 3.10) the lines should be one unit wide, CHBLK.

### 8.5.6 Display mode:

The ECDIS manufacturer should provide the indication of display mode required in the display base by IMO PS Appendix 2, 1.6.

### 8.5.7 Night-time shallow water indicator:

If the entire water area on the display is of less depth than the safety contour, it will not be possible to detect this problem at night due to the small differences between the depth area shades. A faint lattice pattern DIAMOND1 is provided to distinguish shallow water at night (see conditional symbology procedure SEABED01). Display priority is 3, suppressed by radar, IMO category is standard and viewing group is 23010. This is not a required feature, but it is recommended that it be made available

## 8.6 HO-specified display features

### 8.6.1 INFORM, etc., National Language

#### 8.6.1.1 (Details of the above)

The HO may apply the INFORM attribute to any object to carry information that cannot be coded in S-57 format, such as a warning for a traffic junction. There are a total of five similar universal attributes:

INFORM + national language NINFOM
TXTDSC + national language NTXTDS
PICREP

To identify objects with such additional information, the ECDIS should, on mariner's command, identify all objects having any such attribute populated by means of SY(INFORM0I). The mariner should

then be able to access the information by cursor-pick. Note that this applies to all SENC objects whether symbolized by look-up table or conditional symbology procedure.

The pivot point of SY(INFORM01) should be placed at the position of a point object, at the midpoint of a line object, or at the centre of an area object. SY(INFORM01) is intended as a temporary overlay. It's display priority is 8, overradar, category other, viewing group 31030.

**8.6.1.2 (Details of the above)**

National language information is an optional supplement for ECDIS, and is not covered by the Presentation Library. See S-57 Appendix B1 «ENC Specification» section 3.11 for details.

**8.6.2 Relationships and collection objects.**

The immediate significance to display lies in the name of the feature.

**8.6.2.1 (Details of the above)**

For a relationship, the name is the OBJNAM of the co-located master object (buoy, beacon, lighthouse).

In the case of a light, for example, it will be written by a text command calling group 21 (for buoys and beacons) and 26 (for lighthouses).

**8.6.2.2 (Details of the above)**

In the case of a collection object the name is the OBJNAM of the C_AGGR or C_ASSOC object that ties the objects together. It is not written on the display, but should be found by cursor inquiry on any of the member objects, which will routinely include collection object information (see section 8.8).

**8.6.3 ECDIS legend**

A standard legend containing at least the following elements should be available for display. It may either be on the same screen as the ECDIS chart display, or on a separate screen.

The following table indicates which ENC data elements must be used. Values, other than those defined in the data set record, should reflect the situation at the own ship's position:

| | | |
|---|---|---|
| 1. | units for depth | DUNI subfield of the DSPM field |
| 2. | units for height | HUNI subfield of the DSPM field |
| 3. | scale of display | Selected by user. (The default display scale is defined by the CSCL subfield of the DSPM field or CSCALE attribute value of the M_CSCL object.) |
| 4. | data quality indicator | a. CATZOC attribute of the M_QUAL object for bathymetric data<br>b. POSACC attribute of the M_ACCY object (if available) for non-bathymetric data. |

Due to the way quality is encoded in the ENC, both values (a and b) must be used.

| | |
|---|---|
| 5. sounding/vertical datum | SDAT and VDAT subfields of the DSPM field or the VERDAT attribute of the M_SDAT object and M_VDAT object.<br><br>(VERDAT attributes of individual objects must not be used for the legend.) |
| 6. horizontal datum | HDAT subfield of the DSPM field |
| 7. value of safety depth | Selected by user. Default is 30 metres. |
| 8. value of safety contour | Selected by user. Default is 30 metres. |
| 9. magnetic variation | VALMAG, RYRMGV and VALACM of the MAGVAR object. Item must be displayed as VALMAG RYRMGV (VALACM) e.g., 4°15W 1990 (8'E) |
| 10. date and number of latest | ISDT and UPDN subfields of the DSID field of the last update cell update file (ER data set) applied. |
| 11. edition number and date of | EDTN and UADT subfields of the DSID field of the last EN data issue of current ENC issue of the ENC set. |
| 12. chart projection | Projection used for the ECDIS display (e.g., oblique azimuthal). |

The list above is the minimum that should be available, but the complete list need not always be shown. Individual items might be picked by the mariner for display for a period; examples are magnetic variation, data quality for depths (M_QUAL, CATZOC) etc.

### 8.6.4 Light description text strings

The mariner may need to label all lights with a description in order to identify those he can see. An optional light description text-string is provided for this purpose, through conditional symbology procedure LIGHTS05.

## 8.7 Displaying manual updates and added non-ENC chart information.

### 8.7.1. Manual Updates

Manual updates of ENC information should be displayed using the same symbology as ENC information and should be distinguished from ENC information as follows:

#### 8.7.1.1 Added feature:

*Point object*: superimpose SY(CHCRIDnn)*
*Line object*: overwrite with line LC(CHCRIDnn)*
*Area object*: overwrite area boundary with line LC(CHCRIDnn) and superimpose SY(CHCRIDnn) on any centred symbol.

**8.7.1.2 Deleted feature:**

The object should remain on the display and should be marked as follows:

| | |
|---|---|
| *Point object:* | Superimpose SY(CHCRDELn)* |
| *Line object:* | Overwrite with line LC(CHCRDELn)* (do not remove the original line) |
| *Area object*: | Overwrite area boundary with line LC(CHCRDELn) and superimpose SY(CHCRDELn) on any centred symbol. |

*SY(CHCRIDnn) means the current version of symbol CHCRID, i.e., CHCRID01 in 1997. CHCRID and CHCRDEL symbols have the category and viewing group of the object they are attached to, display priority «8», radar priority «O». Note that line symbols LC(CHCRIDnn) and LC(CHCRDELn) should not suppress the underlying line. (See section 8.3.4.1)

Note that the line symbols LC(CHCRIDnn) and LC(CHCRDELn) should not suppress the underlying line (see section 8.3.4.1).

**8.7.1.3 Moved feature:**

As for deleted feature, followed by added feature.

**8.7.1.4 Modified feature:**

a.) If the only modification is an addition(e.g., an existing buoy has a retro-reflector added with no other change): superimpose SY(CHCRIDnn) or LC(CHCRIDnn)

b.) If the only modification is a deletion of a part (e.g., an existing buoy has a fog signal removed, or an area has a «fishing prohibited» restriction removed), then this creates both a change and a deletion and both should be symbolized:

| | |
|---|---|
| *Point:* | superimpose SY(CHCRIDnn) and SY(CHCRDELn) |
| *Line*: | overwrite with LC(CHCRIDnn) and LC(CHCRDELn) |
| *Area:* | overwrite the boundary with LC(CHCRIDnn) and LC(CHCRDELn) and also superimpose SY(CHCRIDnn) and SY(CHCRDELn) on any centred symbol. |

c.) If the modification is an addition and a deletion then it is handled as in 8.7.1.4 b above.

A deleted feature should appear on the display only when its IMO category and viewing group are displayed.

S-52 Appendix 1 requires that a manually updated feature should be capable of the same performance in feature selection, response to cursor-picking, etc., as an ENC feature. In addition, it should provide updating information (identification and source of update, when and by whom entered, etc.) on cursor picking.

**8.7.2 Non-ENC chart information**

**8.7.2.1 (Details of the above)**

Non-ENC chart information (e.g., Harbour Authority survey information, or soundings at a private wharf), should be distinguished from ENC information as follows:

| | |
|---|---|
| *Point object:* | superimpose SY(CHCRIDnn) |
| *Line object:* | overwrite with line LC(CHCRIDnn) |
| *Area object:* | overwrite area boundary with line LC(CHCRIDnn) and superimpose SY(CHCRIDnn) on any centred symbol. |

Non-ENC chart information should be distinguished from manually updated chart information by cursor picking.

**8.7.2.2 (Details of the above)**

Non-ENC chart information may be updated by any systematic procedure, but a record of its addition and deletion should be maintained.

## 8.8 Cursor Pick and interface panel display

### 8.8.1 Cursor Pick

#### 8.8.1.1 Introduction

The ability to cursor-pick on an object for the additional information that lies behind the symbol is an important part of ECDIS capability. However, an unprocessed cursor pick, which does discriminate or interpret and merely dumps on the interface panel all the information available at that point on the display, will normally result in pages of unsorted and barely intelligible attribute information. This section suggests ways of making the information more useful.

#### 8.8.1.2 Interpretation

Attribute values should be connected to their meaning, and the definitions should also be available.

#### 8.8.1.3 Sorting

Unsorted cursor-pick results would be useless for route monitoring, when the mariner needs the information immediately. It would be little use even for route planning, as even then the mariner does not have time to scan through multiple lines of attributes (RECDAT, SCAMIN) that are not relevant to him, perhaps belonging to navigationally insignificant object classes (TESARE, SPRING).

Effective cursor-pick sorting will take much thought and experience. Only initial considerations are given below:

**8.8.1.3.1 (Details of the above)**

Directed cursor enquiry: e.g., The mariner specifies he only wants information on depths and dangers (INT1 II and IK); or aids (IQ); or only chart corrections.

**8.8.1.3.2 (Details of the above)**

Sorting by significance: A general cursor enquiry could be sorted;

(a) by importance of the object class, perhaps using the IMO category,

(b) by the significance of the attribute, the most significant attributes being those used in the look-up table for symbolizing plus:

| | | |
|---|---|---|
| INFORM | QUAPOS | SURSTA |
| TXTDSC | QUASOU | |
| POSACC | | |
| SOUACC | (list not comprehensive) | |

**8.8.1.3.3 (Details of the above)**

Sorting by level of detail: The first line might be the symbol description; followed by object and attribute information; with definitions, etc., by further request.

**8.8.1.4 Spatial and meta-objects, collection objects**

Cursor enquiry should extend to the spatial object, which carries accuracy attributes QUAPOS and POSACC. It should include collection objects which carry the OBJNAM of traffic separation systems, navigation lines (NAVLNE, RECTRC, DWRTCL, etc.). It should include meta-objects, for example, attribute HORDAT, which identifies the local datum to be used to enter IHB S60 for the datum shift parameters needed to convert chart information in the local horizontal datum, to the WGS 84 used in the ENC, for example to enter local chart corrections.

**8.8.2 Mariner interface panel on the same screen as the chart display.**

**8.8.2.1 (Details of the above)**

Alphanumeric information or pictorial representation on the same screen as the chart display should use the UI colours of the colour tables, which are designed to give clarity without overshadowing the more important graphical display. Information on a separate screen is not subject to this limitation.

**8.8.2.2 (Details of the above)**

The mariner should be given all possible assistance to select the contents and configure the interface panel to his best advantage. The essential navigational information such as time, course to steer, off-track distance, etc., etc., should have top priority. Other mandatory and optional items mentioned in this manual have included:

| | |
|---|---|
| Mandatory: | overscale factor (if required)<br>«refer to paper chart» [if LC (HODATA01) is on display or the display is based on non-ENC data] |
| Optional | depth data quality (M_QUAL, CATZOC)<br>magnetic variation<br>etc. |

## 9. SUPPLY AND AMENDMENT OF THE DIGITAL PRESENTATION LIBRARY

***The naming convention for the digital Presentation Library files and the Presentation Library Manual on disk has been changed from edition/revision 3_1 onwards to include the edition/revision number in every instance, so that this can be read without opening the file. The naming has been made consistent across all files. In detail:***

***The .DAI file for edition 3 was named PRSLIB03.DAI, but the first revision has been named PSLB03_1.DAI.***

***The file containing the Manual for edition 3 was named PL03TEXT.WPD, but any file corrected for the immediate amendments which form edition 3/revision 1 should be named PSLB03_1.DOC. (The change to ".DOC" reflects a change to MS Word).***

***The test edition of Presentation Library for edition 3 (which is a complete replacement) has been re-named PSLT03_0.DAI.***

The "official" part of the Presentation Library for ECDIS, consisting of look-up tables; symbols; and colour tables, is supplied in ASCII format in the .DAI file. The name of the file on the distribution disk which

contains the official Presentation Library is "PSLBmm_n" where mm_n is the edition/revision number of the digital file. The edition/revision number also appears in the LBID line at the start of the .DAI file where it is coded digitally and also spelled out in plain language.

The packaging of the Presentation Library as a whole, which includes the Presentation Library Manual with conditional symbology procedures, the ECDIS chart 1, and other features, is described in section 1.4

## 9.1 Amending the Presentation Library (See also Colour & Symbol Specifications sections 1.2.3 and 1.2.4)

9.1.1 Amending the Presentation Library will be important since colours and symbols may change as ECDIS presentation matures in the future. Amendments will be passed to the manufacturer, to be implemented in all his ECDIS systems fitted onboard ship.

9.1.2 Note that at this time conditional symbology procedures are not provided within the .DAI file, but are provided in the Presentation Library Manual either as Nassi-Schneidermann diagrams or as narrative descriptions for manufacturers' use in constructing software to perform these operations.

In addition, the Presentation Library manual contains (in section 8) written instructions for symbolizing special IMO and IHO requirements, which cannot be represented in digital form (e.g. symbolizing manual chart updates).

None of these procedures or instructions will be amended digitally.

9.1.3 A new edition of the symbol library, look-up tables and colour tables of the Presentation Library is transferred in a complete, new, file called "PSLBmm_0.DAI", where mm is the edition number.

An immediate amendment (but not a deferred amendment) will change the edition/revision number of the Presentation Library.

An immediate amendment (but not a deferred amendment) will be accompanied by a revision of the .DAI file, on a floppy disc (or eventually on an internet FTP site). This disk will be a full replacement of the original .DAI file. The revision disc will be called "PSLBmm_n, where mm_n is the edition/revision number of the revised Presentation Library after the immediate amendment is applied. (For example, after immediate amendment 1 is applied to Presentation Library 3.0, the edition/revision number becomes Presentation Library 3.1 and the corresponding disc is therefore called "PSLB03_1.DAI"). The revision disk will be provided free to subscribers to the digital Presentation Library.

After an immediate amendment, the amended Presentation Library Manual, in digital form, will be posted on the IHO web site: http://www.iho.shom.fr. (Note that this will not include any changes to symbols, since the "hard copy addendum" to the Presentation Library, which contains the graphic representations of the symbols, is in fact bound in with the "Colour & Symbol Specifications for ECDIS", which will only be re-issued for a new edition.)

9.1.4 Once a new edition of the library has been initially installed and the ECDIS fitted onboard ship, it must be possible for the manufacturer to insert "immediate amendments" (See Colour & Symbol Specifications section 1.2.4) and subsequent new editions on that ECDIS system.

It is therefore necessary that an amendment file received on board a ship be checked to determine whether the amendment applies to the edition/revision currently installed on the ECDIS. The edition/revision number is located in module 000 01, field LBID, subfield EDTN, which is a string of the form "m.n", where "m" is the edition number and "n" is a sequential revision number. If the edition/revision numbers of the installed Presentation Library and of the amendment do not agree, the amendment must be rejected and the mariner should get a warning.

9.1.5 The ECDIS should keep a record of any amendments applied to the Presentation Library since the latest edition held. The edition/revision numbers should be available to the mariner on request.

As a convenient reference, the following is a summary of Presentation Library file names in January 1999 :

| | |
|---|---|
| official Presentation Library .DAI file for edition 3 revision 1: | PSLB03_1.DAI |
| special .DAI file for test edition, Presentation Library edition 3: | PSLT03_0.DAI |
| special .DAI file for Chart 1, edition 3: | PSC103_0.DAI |
| data file for ECDIS Chart 1: | AANC1XXX.000 |
| Presentation Library Manual, edition 3 revision 1: | PSLB03_1.DOC |

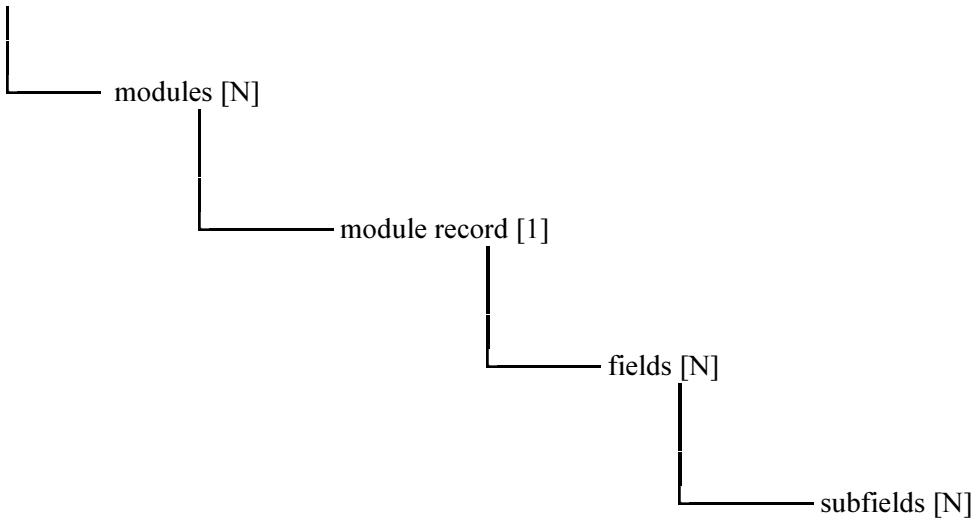
## 9.2 Internal Structure of the Transfer File

The PSLBmm_n.mmm file has a particular internal structure. In the format description (see section 10), several constructs (modules, fields, etc.) are used to convey colour tables, look-up tables, symbols, patterns and linestyles.

The transfer file is formed of one or more modules. Each module is formed of one module record. Each module record is formed of one or more fields which in turn is formed of one or more subfields.

This structure is explained below:

**PSLBmm_n.mmm (module group)**




The lowest level construct, the subfield, must only contain one elementary data item, for example, one colour coordinate or one symbology instruction. Formatted subfields, such as the subfields that contain the vector image definitions, must be further resolved by an application program. In this specification, subfields are not divisible.

The field tag is a unique 4 character field type which links an instance of a field type in a data record to the data descriptive record that defines the syntax of that field type.

The subfield label is a 4 character label, present only in the data descriptive record of a file, required to identify the subfields within a field type. A label preceded by an "*" signifies that that subfield, and any

subsequent ones, repeat within the field. This, therefore, indicates the presence of an array or table, for which the subfield labels provide the column headings.

Subfield data type codes uses data types as follows:

**A** signifies character data,
**I** signifies implicit point representation (integer),
**R** signifies explicit point representation (real or float),

An extent of X(n) indicates a fixed length subfield of length n. An extent of X(1/15) indicates a variable length subfield terminated by the delimiter "1/15" (that is ASCII 1F hexa-decimal or 31 decimal).

## 10. LIBRARY FORMAT DESCRIPTION

This section contains a specification of the format which allows for initial transfer and automatic updating of line styles, fill patterns, point symbols, look-up table entries and colour definitions. The transfer format is '.DAI' format.

The initial transfer file contains a library identification, six colour tables, five look-up tables and all line, pattern, and point symbols; written in that order. The '.DAI' file is written as modules, where the library identification is a single module, each of the colour tables is a single module, each line in the look-up table is a module unto itself and each symbol ( line, pattern or point symbol ) is a module unto itself . Modules are terminated with '****'.

Revision data sets will always include a library identification module. The remaining modules will only be included in the revision set as required, with the exception of the look-up table entries which will be written as a complete replacement set.

For each module and field it is specified whether it can repeat in the file or module. Comments that explain and give domains or constraints are included in "/* ... */".

### 10.1 Format of the Library Identification Module

The library identification module contains general information about the status of the transferred library data. It defines the version of the library as well as its purpose.

#### 10.1.0 'Library Identification' Module

```
||                                        ||
||        Module does not repeat.         ||
||                                        ||
```

### 10.1.1 'Library Identification' (LBID)

```
                ||        Field does not repeat.          ||
                ||       Subfields do not repeat.         ||


     L B I D    Module Identifier
     -------
                /* Forms unique module identification
                   within the exchange set. */

       MODN     A(2)    /* Module Name -
                           two alphabetic characters 'LI'
                           indicating module type.                */

       RCID     I(5)    /* Record Identifier -
                           00000 < x < 32768; with MODN shall
                           form unique identification within
                           the exchange set.                      */

       EXPP     A(3)    /* Exchange Purpose -
                             NEW     Denotes that the exchange
                                     set is a NEW library.
                             REV     Denotes that the exchange
                                     set is a REVision to an
                                     existing library.          */

       PTYP     A(1/15)/* Product Type - e.g. 'IHO'              */

       ESID     A(1/15)/* Exchange Set Identification Number
                           - continuous serial number.            */

       EDTN     A(1/15)/* Edition Number -
                           continuous serial number.              */

       CODT     A(8)    /* Compilation Date of Exchange Set -
                           YYYYMMDD                               */

       COTI     A(6)    /* Compilation Time of Exchange Set -
                           HHMMSS                                 */

       VRDT     A(8)    /* Library-Profile Versions Date -
                           YYYYMMDD                               */
```

```
PROF     A(2)   /* Library Application Profile -
                     PN    Presentation New Information
                     PR    Pres. Revision Information    */

OCDT     A(8)   /* Date of Version of the applied
                   Object Catalogue - YYYYMMDD           */

COMT     A(1/15)/* Comment                               */
```

## 10.2 Format of the Look-Up Table Entry Module

Look-up table entries are transferred in this module. They have to be inserted in the respective look-up table by the recipient. The module allows for the transfer of a complete new edition of a look-up table as well as for the updating of a single entry within a look-up table. To send a new edition this module is repeated for each entry to a look-up table. To update a look-up table a new transmission of a previously transmitted entry (identified by the object class / attribute combination) replaces or deletes the old entry depending on the content of the 'STAT' field ('NIL' for a new edition, 'ADD' for insertion, 'MOD' for replacement, 'DEL' for deletion). Note that where more than one look-up table entry for a specific object class is transferred, look-up table entries shall be grouped and all look-up table entries where the "Attribute Combination"-field is populated must be inserted to the look-up table right after the look-up table entry where the "Attribute Combination"-field is empty and which therefore contains the fail-safe presentation (see section 8.3, for further details).

### 10.2.0 Look-Up Table Entry Module

```
        ||                                        ||
        ||          Module does repeat.           ||
        ||                                        ||
```

### 10.2.1 'Look-Up Table Entry Identifier'-Field (LUPT)

```
        ||       Field does not repeat.           ||
        ||      Subfields do not repeat.          ||


L U P T    Look-Up Table Entry Identifier
-------
         /* Identifies a look-up table Entry module.    */


  MODN   A(2)    /* Module Identifier (Module Name):
                    presently a constant string = 'LU';
                    labels a module of 'look-up table'-
                    type.                              */
```

```
RCID   I(5)    /* Record Identifier:
                  continuous numbering where
                  x is 00000 < x < 32768;
                  uniquely identifies an instruction-module
                  within the data-transfer-set.            */

STAT   A(3)   /*  status of the module contents:
                    'NIL' no change, used for new editions
                    and edition/revisions                  */

OBCL   A(6)   /*  Name of the addressed object class       */

FTYP   A(1)   /*  Addressed Object Type -
                      'A'  Area
                      'L'  Line
                      'P'  Point                           */

DPRI   I(5)   /*  Display Priority                         */

RPRI   A(1)   /*  Radar Priority -
                      'O'  presentation on top radar
                      'S'  presentation suppressed
                           by radar                        */

TNAM   A(1/15)/*  Name of the addressed Look Up Table Set -

         'PLAIN_BOUNDARIES' or 'SYMBOLIZED_BOUNDARIES' (areas)
         'SIMPLIFIED' or 'PAPER_CHART' (points)
          and 'LINES' (lines)                              */
```

### 10.2.2 'Attribute Combination'- Field (ATTC)

```
          ||          Field does repeat.          ||
          ||        Subfields do repeat.          ||


*A T T C    Attribute Combination
 -------
            /* Describes individual characteristics
               of an object which lead to the
               presentation described in the INST-field.
               The attributes of the object catalogue
               shall be used.                          */

  *ATTL     A(6)   /* 6 Character Attribute Code.      */

   ATTV     A(1/15)/* Attribute Value; Shall be a valid
                      value for the domain specified
                      by the attribute label in ATTL.  */
```

### 10.2.3 'Instruction'-Field (INST)

```
                ||        Field does not repeat          ||
                ||       Subfield does not repeat.       ||


      *I N S T    Symbology Instruction
       -------
                   /* Describes the instruction entry to the
                      look-up table;                              */

         SINS      A(1/15)  /* Symbology Instruction String       */
```

### 10.2.4 'Display Category'-Field (DISC)

```
                ||        Field does not repeat          ||
                ||       Subfield does not repeat.       ||


      *D I S C    Display Category
       -------
                   /* Defines membership within a display
                      category                                    */


         DSCN      A(1/15)  /* Name of the display category       */
```

### 10.2.5 'Look-Up Comment'-Field (LUCM)

```
                ||        Field does not repeat          ||
                ||       Subfield does not repeat.       ||

      *L U C M    Look-Up Comment
       -------
                   /* Describes look-up table entry              */

         LUED      A(1/15)  /* free text to describe look-up
                               entry                              */
```

## 10.3 Format of the Symbology Procedure Module (not yet implemented)

Conditional symbology procedures will be transferred in this module which remains to be defined. Symbology procedures (as opposed to symbology instructions) are needed to define varying ("conditional") symbology such as the mariner-selected safety contour. Eventually, it is planned that they will be coded in a standard procedure description language capable of accepting updates. Until this has been developed, such procedures are described in decision diagrams (see section 12). The ECDIS manufacturer should encode these.

## 10.4 Format of the Colour Table Module

The colour-definition (colour token, colour coordinate, usage) for colours is transferred by this module. The module allows for the transfer of a complete new edition of a colour table as well as for the updating of a single entry within a colour table. To send a new edition this module contains all entries of a colour table. To update a colour table a new transmission of a previously transmitted entry (identified by the colour token) replaces or deletes the old entry depending on the content of the 'STAT' field ('NIL' for a new edition, 'ADD' for insertion, 'MOD' for replacement, 'DEL' for deletion).

### 10.4.0 Colour Table Module

```
||                                          ||
||          Module does repeat.             ||
||                                          ||
```

### 10.4.1 'Colour Table Identifier'-Field (COLS)

```
||        Field does not repeat.            ||
||       Subfields do not repeat.           ||
```

```
C O L S    Colour Table Identifier
-------
           /* Identifies a colour-table.                    */

  MODN     A(2)   /* Module Name:
                     constant string ='CS';
                     marks a module of the
                     'Colour Scheme'-type                   */

  RCID     I(5)   /* Record Identifier :
                     continuous numbering where
                     x is 00000 < x < 32768;
                     uniquely identifies a
                     Colour-Table-Module within
                     the transfer-data-set.                 */

  STAT     A(3)   /* status of the module contents:
                     'NIL' no change, used for new editions
                     and edition/revisions                  */

  CTUS     A(1/15)/* Name of the addressed Colour Table;
                     valid keywords are: 'DAY_BRIGHT';
                     'DAY_WHITEBACK'; 'DAY_BLACKBACK';
                     'DUSK'; 'NIGHT'
                     .                                      */
```

### 10.4.2 'Colour Definition CIE'-Field (CCIE)

```
            ||          Field does repeat.          ||
            ||       Subfields do not repeat.       ||

 *C C I E    Colour Definition CIE
  -------
             /* Describes CIE-System's colour-definition     */

   CTOK      A(5)     /* COLOUR (Colour-Token)               */

   CHRX      R(1/15)  /* x-Coordinate (CIE-System)           */

   CHRY      R(1/15)  /* y-Coordinate (CIE-System            */

   CLUM      R(1/15)  /* Luminance    (CIE-System)           */

   CUSE      A(1/15)  /* Use of colour (free text)           */
```

## 10.5 Format of the Pattern Module

Definitions for fill patterns are transferred by this module which may contain a raster image (bit-map) or a vector definition. The maximum size of the raster image is 122 x 122 pixels. The maximum size of the vector space is 32767 by 32767 units. See section 7.4.4 for usage of patterns.

The module allows for the transfer of a complete new edition of fill patterns as well as for the updating of a single fill pattern. To update a fill pattern a new transmission of a previously transmitted fill pattern (identified by the pattern name) replaces or deletes the old version of a fill pattern depending on the content of the 'STAT' field ('NIL' for a new edition, 'ADD' for insertion, 'MOD' for replacement, 'DEL' for deletion).

### 10.5.0 Pattern Module

```
            ||                                        ||
            ||           Module does repeat.          ||
            ||                                        ||
```

### 10.5.1 'Pattern Identifier'-Field (PATT)

```
            ||        Field does not repeat.          ||
            ||       Subfields do not repeat.         ||


 P A T T    Pattern Identifier
 -------
             /* Identifies a pattern-module. */

    MODN   A(2)    /* Module Identifier (Module Name):
                      presently a constant string = 'PT';
                      labels a module of the
                      'pattern'-type.                    */
```

```
   RCID   I(5)    /* Record Identifier:
                     continuous numbering where
                     x is 00000 < x < 32768;
                     uniquely identifies a pattern-module
                     within the data-transfer-set.          */

   STAT   A(3)    /*  status of the module contents:
                       'NIL' no change, used for new editions
                       and edition/revisions                 */
```

### 10.5.2 'Pattern Definition'-Field (PATD)

```
          ||       Field does not repeat.        ||
          ||      Subfields do not repeat.       ||

P A T D    Pattern Definition
-------
           /* defines several pattern-parameters.  */

   PANM   A(8)    /* name of the fill pattern;              */

   PADF   A(1)    /* type of pattern definition:
                        V   Vector definition
                        R   Raster definition               */

   PATP   A(3)    /* type of the fill pattern:
                        STG    staggered pattern
                        LIN    linear    pattern            */

   PASP   A(3)    /* pattern-symbol spacing:
                        CON    constant space
                        SCL    scale dependent spacing      */

   PAMI   I(5)    /* minimum distance (units of 0.01 mm)
                     between pattern symbols covers
                     (bounding box + pivot point);
                     where 0 <= PAMI <= 32767               */

   PAMA   I(5)    /* maximum distance (units of 0.01 mm)
                     between pattern symbols covers
                     (bounding box + pivot point);
                     where 0 <= PAMA <= 32767;
                     PAMA is meaningless if PASP = 'CON'    */

   PACL   I(5)    /* pivot-point's column number;
                     PACL is counted from the top, left corner
                     of the vector/raster space to the right;
                     -9999 (left) <= PACL <= 32767 (right)  */
```

```
PARW   I(5)    /* pivot-point's row number;
                  PARW is counted from the top, left corner
                  of the vector/raster space to the bottom;
                  -9999 (top) <= PARW <= 32767 (bottom)     */

PAHL   I(5)    /* width of bounding box;
                  where 1<= PAHL <=122  for raster and
                  where 1<= PAHL <=32767 for vector
                  Note: does not include vector line width */

PAVL   I(5)    /* height of bounding box;
                  where 1<= PAVL <=122  for raster and
                  where 1<= PAGL <=32767 for vector
                  Note: does not include vector line width */

PBXC   I(5)    /* bounding box upper left column number;
                  where 0<= PBXC <=122  for raster and
                  where 0<= PBXC <=32767 for vector         */

PBXR   I(5)    /* bounding box upper left row number;
                  where 0<= PBXR <=122  for raster and
                  where 0<= PBXR <=32767 for vector         */
```

### 10.5.3 'Pattern Exposition'-Field (PXPO)

```
      ||           Field does repeat.          ||
      ||        Subfield does not repeat.      ||

P X P O    Pattern Exposition Field
-------
           /* describes meaning & use of symbology
              elements                                      */

  EXPT   A(1/15)    /* free text for symbology
                       explanation                          */
```

### 10.5.4 'Pattern Colour Reference'- Field (PCRF)

```
         ||         Field does not repeat.       ||
         ||          Subfields do repeat.        ||

P C R F    Pattern Colour Reference
-------
           /* Contains the colour reference for the
              bitmap or vector field.                       */

 *CIDX     A(1)   /* Letter (ASCII >= 64) used as colour
                     index within PBTM.BITR field or
                     within the PBTM.VECT field.            */
```

```
      CTOK     A(5)   /* colour token which is identified
                         by the letter in CIDX.              */
```

### 10.5.5 'Pattern Bitmap'- Field (PBTM)

```
                ||          Field does repeat.           ||
                ||     Number of repetitions shall be    ||
                ||   identical to content of PAVL-field  ||
                ||       Subfield does not repeat.       ||

     *P B T M    Pattern Bitmap
      -------
                 /* Contains one row of a raster image; each
                    pixel is represented by a letter
                    (ASCII>=64); The letter represents a colour
                    token defined within the PCRF.CTOK
                    subfield. The letter '@'represents a 100%
                    transparent pixel (TRNSP). Note: PBTM and
                    PVCT are mutual exclusive.              */

       BITR     A(1/15)/* Raster Bit-map Row -
                          maximal length 122 characters;
                          The length shall be identical to
                          content of PAHL-field.            */
```

### 10.5.6 'Pattern Vector'- Field (PVCT)

```
                ||            Field does repeat.       ||
                ||          Subfield does not repeat    ||

     *P V C T    Pattern Vector
      -------
                 /* Contains a vector image definition;
                    Colours are identified by a letter
                    (ASCII>=64); The letter represents a colour
                    token defined within the PCRF.CTOK
                    subfield. The letter '@'identifies a
                    fully transparent colour. Note: PVCT and
                    PBTM are mutual exclusive.              */

       VECD     A(1/15)   /* String of vector commands;     */
```

### 10.5.7 Example for a Raster Image Pattern Definition

The example illustrates the raster definition for the fill pattern of an anchorage area (pattern name 'ACHARE01'). The pattern represents an anchor in red (CHRED, represented by the letter A) and black (CHBLK, identified by letter B). Locations in the pattern carrying the '@'-sign are 100% transparent (TRNSP). It is a "staggered" pattern (STG). The symbol spacing is scale dependent (SCL). The minimum distance between the symbols is 10mm (1000 x 0.01mm), the maximum distance is 50 mm (5000 x 0.01mm). The pivot point of the pattern symbol is situated in row 10, column 10. The size of the pattern symbol is 20 by 18 pixels.

```
PATT   10PT00001NIL
PATD   55ACHARE01RSTGSCL010000500000010000100002000018000000000
PCRF   12ACHREDBCHBLK
PBTM   21@@@@@@@@@@@@@@@@@@@@↓
PBTM   21@@@@@@AAAAAABB@@@@@@↓
PBTM   21@@@@@@AAAAAABB@@@@@@↓
PBTM   21@@AAAAAABBAAAAAABB@@↓
PBTM   21@@AAAAAABBAAAAAABB@@↓
PBTM   21@@@@@@AAAAAABB@@@@@@↓
PBTM   21@@@@@@AAAAAABB@@@@@@↓
PBTM   21@@@@@@@@AABB@@@@@@@@↓
PBTM   21@@@@@@@@AABB@@@@@@@@↓
PBTM   21@@@@@@@@AABB@@@@@@@@↓
PBTM   21@@@@@@@@AABB@@@@@@@@↓
PBTM   21@@AABB@@AABB@@AABB@@↓
PBTM   21@@AABB@@AABB@@AABB@@↓
PBTM   21@@@@AABBAABBAABB@@@@↓
PBTM   21@@@@AABBAABBAABB@@@@↓
PBTM   21@@@@@@AAAAAABB@@@@@@↓
PBTM   21@@@@@@AAAAAABB@@@@@@↓
PBTM   21@@@@@@@@@@@@@@@@@@@@↓
```

Note that the use of raster pattern definitions is the subject of further study. Currently, the Presentation Library does not contain any raster image pattern definitions.

### 10.5.8 Example for a Vector Image Pattern Definition

The example illustrates a vector definition for a fill pattern (pattern name 'SAMPLE01') which is sent as a replacement of a previous one. The pattern shows a rectangle drawn in chart grey, dominant (CHGRD, identified by the letter A) with a pen width of 0.6 mm (2 x 0.3mm). It is a linear pattern (LIN). The symbol spacing is constant (CON). The distance between the symbols is 5 mm (500 x 0.01 mm). The pivot point of the pattern symbol is situated in row 500, column 500 of the coordinate space. The pattern has a size of 10mm by 10mm (1000 x 0.01mm). The upper left corner of the bounding box is located at position 1,1.

```
PATT   10PT00001MOD
PATD   55SAMPLE01VLINCON00500000000050000500010000100000000100001
PXPO   32This is a sample vector pattern ↓
PCRF   6ACHGRD
PVCT   15SPA;SW2;PU1,1;↓
PVCT   31PD1000,1,1000,1000,1,1000,1,1;↓
```

See section 5 for further explanation of the vector symbol description language.

## 10.6 Format of the Symbol Module

Definitions for symbols are transferred by this module which contains either a raster image (bit-map) or a vector definition of the symbol. The maximum size of the raster image is 64 x 64 pixels. The maximum extent of the vector space is 32767 by 32767 units.

The module allows for the transfer of a complete new edition of point symbols as well as for the updating of a single symbol. To update a symbol a new transmission of a previously transmitted symbol (identified by the symbol name) replaces or deletes the old version of a symbol depending on the content of the 'STAT' field ('NIL' for a new edition, 'ADD' for insertion, 'MOD' for replacement, 'DEL' for deletion).

### 10.6.0 Symbol Module

```
            ||                                        ||
            ||          Module does repeat.           ||
            ||                                        ||
```

### 10.6.1 'Symbol Identifier'-Field (SYMB)

```
            ||        Field does not repeat.          ||
            ||       Subfields do not repeat.         ||
```

```
S Y M B     Symbol Identifier
-------
            /* identifies a symbol-module.                    */

   MODN   A(2)    /* Module Identifier (Module Name):
                     presently a constant string ='SY';
                     labels a module of the
                     'Symbol'-type.                           */

   RCID   I(5)    /* Record Identifier:
                     continuous numbering where
                     x is 00000 < x < 32768;
                     uniquely identifies a symbol-
                     module within the
                     data-transfer-set.                       */

   STAT   A(3)    /*  status of the module contents:
                       'NIL' no change, used for new editions
                       and edition/revisions                  */
```

### 10.6.2 'Symbol Definition'-Field (SYMD)

```
            ||        Field does not repeat.          ||
            ||       Subfields do not repeat.         ||

    S Y M D    Symbol Definition
    -------
               /* Defines several symbol-parameters.                */


       SYNM   A(8)    /* name of the symbol;                         */

       SYDF   A(1)    /* type of symbol definition:
                            V   Vector definition
                            R   Raster definition                    */

       SYCL   I(5)    /* pivot-point's column-number;
                         SYCL is counted from the top,
                         left corner of the vector/raster
                         space to the right;
                         -9999 (left) <= SYCL <= 32767 (right)     */

       SYRW   I(5)    /* pivot-point's row-number;
                         PROW is counted from the top, left
                         corner of the vector/raster space
                         to the bottom ;
                         -9999 (top) <= SYRW <= 32767 (bottom)     */

       SYHL   I(5)    /* width of bounding box;
                         where 1<= PAHL <=128  for raster and
                         where 1<= PAHL <=32767 for vector
                         Note: does not include vector line width  */

       SYVL   I(5)    /* height of bounding box;
                         where 1<= PAVL <=128  for raster and
                         where 1<= PAGL <=32767 for vector
                         Note: does not include vector line width  */

       SBXC   I(5)    /* bounding box upper left column number;
                         where 1<= SBXC <=128  for raster and
                         where 1<= SBXC <=32767 for vector         */

       SBXR   I(5)    /* bounding box upper left row number;
                         where 1<= SBXR <=128  for raster and
                         where 1<= SBXR <=32767 for vector         */
```

### 10.6.3 'Symbol Exposition'- Field (SXPO)

The exposition field for the symbol module is identical to the exposition field for the pattern module (see 10.5.3).

### 10.6.4 'Symbol Colour Reference'- Field (SCRF)

The colour reference field for the symbol module is identical to the colour reference field for the pattern module (see 10.5.4).

### 10.6.5 'Symbol Bitmap'- Field (SBTM)

The bitmap field for the symbol module is identical to the bitmap field for the pattern module (see 10.5.5).

### 10.6.6 'Symbol Vector'- Field (SVCT)

The vector field for the symbol module is identical to the vector field for the pattern module (see 10.5.6).

### 10.6.7 Example for a Raster Image Symbol Module

Note that the use of raster symbol definitions is the subject of further study. Currently, the Presentation Library does not contain any raster symbol definitions.

The following example illustrates the raster definition for the symbol 'BCNCAR01' (north cardinal beacon). The raster shows two tip-up cones in black (CHBLK, identified by the letter A). Locations carrying the '@'-sign are 100% transparent (TRNSP). The pivot-point is located at the raster's column 8, row 10. The pattern has a size of 16 by 18 pixels. There is a textual explanation available for the symbol within the SXPO-field.

```
SYMB   10SY00001NIL
SYMD   39BCNCAR01R000080001000014000180000000000
SXPO   36This simplified symbol is used for↓
SXPO   27north cardinal buoys only.↓
SCRF   6ACHBLK
SBTM   15@@@@@@AA@@@@@@↓
SBTM   15@@@@@@AA@@@@@@↓
SBTM   15@@@@AAAAAA@@@@↓
SBTM   15@@@@AAAAAA@@@@↓
SBTM   15@@AAAAAAAAAA@@↓
SBTM   15@@AAAAAAAAAA@@↓
SBTM   15AAAAAAAAAAAAAA↓
SBTM   15AAAAAAAAAAAAAA↓
SBTM   15@@@@@@@@@@@@@@↓
SBTM   15@@@@@@@@@@@@@@↓
SBTM   15@@@@@@AA@@@@@@↓
SBTM   15@@@@@@AA@@@@@@↓
SBTM   15@@@@AAAAAA@@@@↓
SBTM   15@@@@AAAAAA@@@@↓
SBTM   15@@AAAAAAAAAA@@↓
SBTM   15@@AAAAAAAAAA@@↓
SBTM   15AAAAAAAAAAAAAA↓
SBTM   15AAAAAAAAAAAAAA↓
```

### 10.6.8 Example for a Vector Image Symbol Module

The example shows the vector definition for the symbol 'SAMPLE33'. The pivot point of the symbol is situated in row 400, column 400 of the coordinate space. The symbol has a size of 8mm by 8mm (800 x 0.01mm). The upper left corner of the bounding box is located at position 1,1.

```
SYMB   10SY00001NIL
SYMD   39SAMPLE33V00400004000080000800000100001
SCRF   6ACHBLK
SVCT   15SPA;SW2;PU1,1;↓
SVCT   28PD1000,1,800,800,1,800,1,1;↓
```

See section 5) for further explanation of the vector symbol description language.

## 10.7 Format of the Complex Linestyle Module

Definitions for complex linestyles are transferred by this module which contains a vector definition.

The module allows for the transfer of a complete new edition of linestyles as well as for the updating of a single linestyle. To update a linestyle a new transmission of a previously transmitted linestyle (identified by the linestyle name) replaces or deletes the old version of a linestyle depending on the content of the 'STAT' field ('NIL' for a new edition, 'ADD' for insertion, 'MOD' for replacement, 'DEL' for deletion).

### 10.7.0 Linestyle Module

```
            ||                                        ||
            ||          Module does repeat.           ||
            ||                                        ||
```

### 10.7.1 'Linestyle Identifier'- Field (LNST)

```
            ||        Field does not repeat.          ||
            ||       Subfields do not repeat.         ||
```

```
   L N S T    Linestyle Identifier
   -------
              /* identifies a linestyle-module.                  */

      MODN   A(2)    /* Module Identifier (Module Name):
                        presently a constant string ='LS';
                        labels a module of 'Linestyle'-type.     */

      RCID   I(5)    /* Record Identifier:
                        continuous numbering where
                        x is 00000 < x < 32768;
                        uniquely identifies a linestyle-module
                        within the data-transfer-set.            */
```

```
   STAT   A(3)    /*  status of the module contents:
                       'NIL' no change, used for new editions
                       and edition/revisions                */
```

### 10.7.2 'Linestyle Definition'- Field (LIND)

```
            ||        Field does not repeat.         ||
            ||       Subfields do not repeat.        ||


L I N D    Linestyle Definition
-------
            /* Defines several linestyle-parameters.          */


   LINM   A(8)    /* name of the linestyle;                    */

   LICL   I(5)    /* pivot-point's column-number;
                     LICL is counted from the top,
                     left corner of the vector space
                     to the right;
                     -9999 (left) <= LICL <= 32767 (right)     */

   LIRW   I(5)    /* pivot-point's row-number;
                     LIRW is counted from the top
                     left corner of the vector space
                     to the bottom;
                     -9999 (top) <= LIRW <= 32767 (bottom)     */

   LIHL   I(5)    /* width of bounding box;
                     where 1<= LIHL <=32767;
                     Note: does not include vector line width  */

   LIVL   I(5)    /* height of bounding box;
                     where 1<= LIVL <=32767;
                     Note: does not include vector line width  */

   LBXC   I(5)    /* bounding box upper left column number;
                     where 0<= LBXC <=32767;                   */

   LBXR   I(5)    /* bounding box upper left row number;
                     where 0<= LBXR <=32767;                   */
```

### 10.7.3 'Linestyle Exposition'- Field (LXPO)

The exposition field for the linestyle module is identical to the exposition field for the pattern module (see 10.5.3).

### 10.7.4 'Linestyle Colour Reference'- Field (LCRF)

The colour reference field for the linestyle module is identical to the colour reference field for the pattern module (see 10.5.4).

### 10.7.5 'Linestyle Vector'- Field (LVCT)

The vector field for the linestyle module is identical to the vector field for the pattern module (see 10.5.6).

### 10.7.6 Example for a Linestyle Module

The example shows the vector definition for the linestyle 'CBLLNE01'. The centre line of the linestyle is situated in column 750, row 750 of the coordinate space. The linestyle shows a curved line, width 0.3mm (1 x 0.3mm).

```
LNST  10LS00000NIL
LIND  38CBLLNE01007500075000200001000075000700
LCRF  6ICHMGD
LVCT  57SPI;PU850,750;SW1;AA900,750,180;PU850,750;AA800,750,180;
```

See section 5 for further explanation of the vector symbol description language.

## 11. LOOK-UP TABLE LISTINGS

The Presentation Library provides five look-up tables:

1a. paper chart point symbols (buoys and beacons are similar to the paper chart)
1b. simplified point symbols (buoys and beacons are more prominent)
2. line symbols
3a. area symbols with plain boundaries (for general use)
3b. area symbols with symbolized boundaries (for large scale display)

The ECDIS should provide all of these and make the options available to the mariner.

The following look-up table listings are sample prints of the look-up table files. The up to date versions can be found on the distribution CD-Rom.

Some of the look-up table entries describe the presentation of mariners' navigational objects. Please see S-52 / Appendix 2 / Annex A / Part 2 for further details and definitions of mariners' navigational object classes.

See 8.3 for further explanation how to use the look-up tables.

## 11.1 Look-Up Table Listing for Object Type Point 'P'

### 11.1.1 Look-up table for paper chart point symbolization

```
* *** PAPER CHART POINTS                          ***
* *** This is the look-up table for point symbolization. ***
* *** For edition 3.2 Preslib, dated March  2000          ***
*
* Each line contains minimum 6 fields:
*  1. field - code of the object class
*  2. field - attribute combination
*  3. field - symbolization instruction
*  4. field - display priority
*  5. field - radar
*  6. field - IMO display category
*  7. field - viewing group (optional)
*
* Each field entry is framed by "' and fields are separated by ','.
*
* Please note, that the entries to this table must be in
* alphabetic order (sorted by the class code).
*
* This table has 2 sections:
*
* - The first section contains symbolization instructions for
*   standard S-57 'real world' objects:
* - The second section contains symbolization instructions for
*   non-standard (class code in lowercase) objects:
*
* default for symbolization failure; must be the first entry to look-up table
"######","","SY(QUESMRK1)","5","O","STANDARD","21010"
*
* ***                          ***
* *** section one: REAL WORLD CLASSES ***
* ***                          ***
*
"ACHARE","","SY(ACHARE02)","6","O","STANDARD","26220"
"ACHBRT","","SY(ACHBRT07);TE('No %s','OBJNAM',3,1,2,'15110',1,0,CHBLK,29)","5","O","STANDARD","26220"
"AIRARE","","SY(AIRARE02)","4","O","OTHER","32240"
"BCNCAR","","SY(BCNGEN03);TE('bn %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","DISPLAYBASE","17020"
"BCNCAR","BCNSHP1\r","SY(BCNSTK02);TE('bn %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","DISPLAYBASE","17020"
"BCNCAR","BCNSHP3\r","SY(BCNTOW01);TE('bn %s','OBJNAM',2,1,2,'15110',-1,-2,CHBLK,21)","8","O","DISPLAYBASE","17020"
"BCNCAR","BCNSHP4\r","SY(BCNLTC01);TE('bn %s','OBJNAM',2,1,2,'15110',-1,-2,CHBLK,21)","8","O","DISPLAYBASE","17020"
"BCNCAR","BCNSHP5\r","SY(BCNGEN01);TE('bn %s','OBJNAM',2,1,2,'15110',-1,-2,CHBLK,21)","8","O","DISPLAYBASE","17020"
"BCNCAR","BCNSHP7\r","SY(BCNGEN01);TE('bn %s','OBJNAM',2,1,2,'15110',-1,-2,CHBLK,21)","8","O","DISPLAYBASE","17020"
"BCNISD","","SY(BCNGEN03);TE('bn %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","DISPLAYBASE","17020"
"BCNISD","BCNSHP1\r","SY(BCNSTK02);TE('bn %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","DISPLAYBASE","17020"
"BCNISD","BCNSHP3\r","SY(BCNTOW01);TE('bn %s','OBJNAM',2,1,2,'15110',-1,-2,CHBLK,21)","8","O","DISPLAYBASE","17020"
"BCNISD","BCNSHP4\r","SY(BCNLTC01);TE('bn %s','OBJNAM',2,1,2,'15110',-1,-2,CHBLK,21)","8","O","DISPLAYBASE","17020"
"BCNISD","BCNSHP5\r","SY(BCNGEN01);TE('bn %s','OBJNAM',2,1,2,'15110',-1,-2,CHBLK,21)","8","O","DISPLAYBASE","17020"
"BCNISD","BCNSHP7\r","SY(BCNGEN01);TE('bn %s','OBJNAM',2,1,2,'15110',-1,-2,CHBLK,21)","8","O","DISPLAYBASE","17020"
"BCNLAT","","SY(BCNGEN03);TE('bn %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","DISPLAYBASE","17020"
"BCNLAT","BCNSHP2\rCATLAM1\r","SY(PRICKE03);TE('bn %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","DISPLAYBASE","17020"
"BCNLAT","BCNSHP2\rCATLAM2\r","SY(PRICKE04);TE('bn %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","DISPLAYBASE","17020"
"BCNLAT","BCNSHP6\rCONVIS1\r","SY(CAIRNS11);TE('bn %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","DISPLAYBASE","17020"
"BCNLAT","BCNSHP1\r","SY(BCNSTK02);TE('bn %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","DISPLAYBASE","17020"
"BCNLAT","BCNSHP3\r","SY(BCNTOW01);TE('bn %s','OBJNAM',2,1,2,'15110',-1,-2,CHBLK,21)","8","O","DISPLAYBASE","17020"
"BCNLAT","BCNSHP4\r","SY(BCNLTC01);TE('bn %s','OBJNAM',2,1,2,'15110',-1,-2,CHBLK,21)","8","O","DISPLAYBASE","17020"
"BCNLAT","BCNSHP5\r","SY(BCNGEN01);TE('bn %s','OBJNAM',2,1,2,'15110',-1,-2,CHBLK,21)","8","O","DISPLAYBASE","17020"
"BCNLAT","BCNSHP6\r","SY(CAIRNS01);TE('bn %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","DISPLAYBASE","17020"
"BCNLAT","BCNSHP7\r","SY(BCNGEN01);TE('bn %s','OBJNAM',2,1,2,'15110',-1,-2,CHBLK,21)","8","O","DISPLAYBASE","17020"
"BCNSAW","","SY(BCNGEN03);TE('bn %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","DISPLAYBASE","17020"
"BCNSAW","BCNSHP1\r","SY(BCNSTK02);TE('bn %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","DISPLAYBASE","17020"
"BCNSAW","BCNSHP3\r","SY(BCNTOW01);TE('bn %s','OBJNAM',2,1,2,'15110',-1,-2,CHBLK,21)","8","O","DISPLAYBASE","17020"
"BCNSAW","BCNSHP4\r","SY(BCNLTC01);TE('bn %s','OBJNAM',2,1,2,'15110',-1,-2,CHBLK,21)","8","O","DISPLAYBASE","17020"
"BCNSAW","BCNSHP5\r","SY(BCNGEN01);TE('bn %s','OBJNAM',2,1,2,'15110',-1,-2,CHBLK,21)","8","O","DISPLAYBASE","17020"
"BCNSAW","BCNSHP7\r","SY(BCNGEN01);TE('bn %s','OBJNAM',2,1,2,'15110',-1,-2,CHBLK,21)","8","O","DISPLAYBASE","17020"
"BCNSPP","","SY(BCNGEN03);TE('bn %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","DISPLAYBASE","17020"
"BCNSPP","BCNSHP6\rCONVIS1\r","SY(CAIRNS11);TE('bn %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","DISPLAYBASE","17020"
"BCNSPP","CATSPM18\r","SY(NOTBRD11);TE('bn %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","DISPLAYBASE","17020"
```

"BCNSPP","CATSPM44`r","SY(BCNGEN01);TE('bn %s',OBJNAM',2,1,2,'15110',-1,-2,CHBLK,21)","8","O","DISPLAYBASE","17020"
"BCNSPP","BCNSHP1`r","SY(BCNSTK02);TE('bn %s',OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","DISPLAYBASE","17020"
"BCNSPP","BCNSHP3`r","SY(BCNTOW01);TE('bn %s',OBJNAM',2,1,2,'15110',-1,-2,CHBLK,21)","8","O","DISPLAYBASE","17020"
"BCNSPP","BCNSHP4`r","SY(BCNLTC01);TE('bn %s',OBJNAM',2,1,2,'15110',-1,-2,CHBLK,21)","8","O","DISPLAYBASE","17020"
"BCNSPP","BCNSHP5`r","SY(BCNGEN01);TE('bn %s',OBJNAM',2,1,2,'15110',-1,-2,CHBLK,21)","8","O","DISPLAYBASE","17020"
"BCNSPP","BCNSHP6`r","SY(CAIRNS01);TE('bn %s',OBJNAM',2,1,2,'15110',-1,-2,CHBLK,21)","8","O","DISPLAYBASE","17020"
"BCNSPP","BCNSHP7`r","SY(BCNGEN01);TE('bn %s',OBJNAM',2,1,2,'15110',-1,-2,CHBLK,21)","8","O","DISPLAYBASE","17020"
"BERTHS","","SY(BRTHNO01);TE('No %s',OBJNAM',3,1,2,'15110',1,0,CHBLK,29)","3","O","OTHER","32440"
"BOYCAR","","SY(BOYGEN03);TE('by %s',OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","DISPLAYBASE","17010"
"BOYCAR","BOYSHP1`r","SY(BOYCON01);TE('by %s',OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","DISPLAYBASE","17010"
"BOYCAR","BOYSHP2`r","SY(BOYCAN01);TE('by %s',OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","DISPLAYBASE","17010"
"BOYCAR","BOYSHP3`r","SY(BOYSPH01);TE('by %s',OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","DISPLAYBASE","17010"
"BOYCAR","BOYSHP4`r","SY(BOYPIL01);TE('by %s',OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","DISPLAYBASE","17010"
"BOYCAR","BOYSHP5`r","SY(BOYSPR01);TE('by %s',OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","DISPLAYBASE","17010"
"BOYCAR","BOYSHP6`r","SY(BOYBAR01);TE('by %s',OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","DISPLAYBASE","17010"
"BOYCAR","BOYSHP7`r","SY(BOYSUP01);TE('by %s',OBJNAM',2,1,2,'15110',-2,-1,CHBLK,21)","8","O","DISPLAYBASE","17010"
"BOYCAR","BOYSHP8`r","SY(BOYSPR01);TE('by %s',OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","DISPLAYBASE","17010"
"BOYINB","","SY(BOYINB01);TE('by %s',OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","DISPLAYBASE","17010"
"BOYISD","","SY(BOYGEN03);TE('by %s',OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","DISPLAYBASE","17010"
"BOYISD","BOYSHP1`r","SY(BOYCON01);TE('by %s',OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","DISPLAYBASE","17010"
"BOYISD","BOYSHP2`r","SY(BOYCAN01);TE('by %s',OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","DISPLAYBASE","17010"
"BOYISD","BOYSHP3`r","SY(BOYSPH01);TE('by %s',OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","DISPLAYBASE","17010"
"BOYISD","BOYSHP4`r","SY(BOYPIL01);TE('by %s',OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","DISPLAYBASE","17010"
"BOYISD","BOYSHP5`r","SY(BOYSPR01);TE('by %s',OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","DISPLAYBASE","17010"
"BOYISD","BOYSHP6`r","SY(BOYBAR01);TE('by %s',OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","DISPLAYBASE","17010"
"BOYISD","BOYSHP7`r","SY(BOYSUP01);TE('by %s',OBJNAM',2,1,2,'15110',-2,-1,CHBLK,21)","8","O","DISPLAYBASE","17010"
"BOYISD","BOYSHP8`r","SY(BOYSPR01);TE('by %s',OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","DISPLAYBASE","17010"
"BOYLAT","","SY(BOYGEN03);TE('by %s',OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","DISPLAYBASE","17010"
"BOYLAT","BOYSHP1`r","SY(BOYCON01);TE('by %s',OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","DISPLAYBASE","17010"
"BOYLAT","BOYSHP2`r","SY(BOYCAN01);TE('by %s',OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","DISPLAYBASE","17010"
"BOYLAT","BOYSHP3`r","SY(BOYSPH01);TE('by %s',OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","DISPLAYBASE","17010"
"BOYLAT","BOYSHP4`r","SY(BOYPIL01);TE('by %s',OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","DISPLAYBASE","17010"
"BOYLAT","BOYSHP5`r","SY(BOYSPR01);TE('by %s',OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","DISPLAYBASE","17010"
"BOYLAT","BOYSHP6`r","SY(BOYBAR01);TE('by %s',OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","DISPLAYBASE","17010"
"BOYLAT","BOYSHP7`r","SY(BOYSUP01);TE('by %s',OBJNAM',2,1,2,'15110',-2,-1,CHBLK,21)","8","O","DISPLAYBASE","17010"
"BOYLAT","BOYSHP8`r","SY(BOYSPR01);TE('by %s',OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","DISPLAYBASE","17010"
"BOYSAW","","SY(BOYGEN03);TE('by %s',OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","DISPLAYBASE","17010"
"BOYSAW","BOYSHP3`r","SY(BOYSPH01);TE('by %s',OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","DISPLAYBASE","17010"
"BOYSAW","BOYSHP4`r","SY(BOYPIL01);TE('by %s',OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","DISPLAYBASE","17010"
"BOYSAW","BOYSHP5`r","SY(BOYSPR01);TE('by %s',OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","DISPLAYBASE","17010"
"BOYSAW","BOYSHP6`r","SY(BOYBAR01);TE('by %s',OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","DISPLAYBASE","17010"
"BOYSAW","BOYSHP7`r","SY(BOYSUP01);TE('by %s',OBJNAM',2,1,2,'15110',-2,-1,CHBLK,21)","8","O","DISPLAYBASE","17010"
"BOYSAW","BOYSHP8`r","SY(BOYSPR01);TE('by %s',OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","DISPLAYBASE","17010"
"BOYSPP","","SY(BOYGEN03);TE('by %s',OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","DISPLAYBASE","17010"
"BOYSPP","CATSPM9`r","SY(BOYSUP01);TE('by %s',OBJNAM',2,1,2,'15110',-2,-1,CHBLK,21)","8","O","DISPLAYBASE","17010"
"BOYSPP","CATSPM15`r","SY(BOYSUP03);TE('by %s',OBJNAM',2,1,2,'15110',-2,-1,CHBLK,21)","8","O","DISPLAYBASE","17010"
"BOYSPP","BOYSHP1`r","SY(BOYCON01);TE('by %s',OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","DISPLAYBASE","17010"
"BOYSPP","BOYSHP2`r","SY(BOYCAN01);TE('by %s',OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","DISPLAYBASE","17010"
"BOYSPP","BOYSHP3`r","SY(BOYSPH01);TE('by %s',OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","DISPLAYBASE","17010"
"BOYSPP","BOYSHP4`r","SY(BOYPIL01);TE('by %s',OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","DISPLAYBASE","17010"
"BOYSPP","BOYSHP5`r","SY(BOYSPR01);TE('by %s',OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","DISPLAYBASE","17010"
"BOYSPP","BOYSHP6`r","SY(BOYBAR01);TE('by %s',OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","DISPLAYBASE","17010"
"BOYSPP","BOYSHP7`r","SY(BOYSUP01);TE('by %s',OBJNAM',2,1,2,'15110',-2,-1,CHBLK,21)","8","O","DISPLAYBASE","17010"
"BOYSPP","BOYSHP8`r","SY(BOYSPR01);TE('by %s',OBJNAM',2,1,2,'15110',-2,-1,CHBLK,21)","8","O","DISPLAYBASE","17010"
"BRIDGE","","","","","S","",""
"BUAARE","","SY(BUAARE02);TX(OBJNAM,3,2,2,'15110',1,0,CHBLK,26)","3","O","STANDARD","22240"
"BUISGL","","SY(BUISGL01)","4","O","OTHER","32220"
"BUISGL","FUNCTN33`rCONVIS1`rOBJNAM`r","SY(POSGEN03);TX(OBJNAM,3,2,2,'15110',1,0,CHBLK,26)","6","O","STANDARD","22220"
"BUISGL","FUNCTN20`rCONVIS1`r","SY(BUIREL13)","6","O","STANDARD","22220"
"BUISGL","FUNCTN21`rCONVIS1`r","SY(BUIREL13)","6","O","STANDARD","22220"
"BUISGL","FUNCTN22`rCONVIS1`r","SY(BUIREL14)","6","O","STANDARD","22220"
"BUISGL","FUNCTN23`rCONVIS1`r","SY(BUIREL14)","6","O","STANDARD","22220"
"BUISGL","FUNCTN24`rCONVIS1`r","SY(BUIREL14)","6","O","STANDARD","22220"
"BUISGL","FUNCTN25`rCONVIS1`r","SY(BUIREL14)","6","O","STANDARD","22220"
"BUISGL","FUNCTN26`rCONVIS1`r","SY(BUIREL15)","6","O","STANDARD","22220"
"BUISGL","FUNCTN27`rCONVIS1`r","SY(BUIREL15)","6","O","STANDARD","22220"
"BUISGL","FUNCTN33`rCONVIS1`r","SY(POSGEN03)","6","O","STANDARD","22220"
"BUISGL","FUNCTN35`rCONVIS1`r","SY(TNKCON12)","6","O","STANDARD","22220"
"BUISGL","FUNCTN33`rOBJNAM`r","SY(POSGEN03);TX(OBJNAM,3,2,2,'15110',1,0,CHBLK,26)","4","O","OTHER","32220"
"BUISGL","CONVIS1`r","SY(BUISGL11)","6","O","STANDARD","22220"
"BUISGL","FUNCTN20`r","SY(BUIREL01)","4","O","OTHER","32220"
"BUISGL","FUNCTN21`r","SY(BUIREL01)","4","O","OTHER","32220"
"BUISGL","FUNCTN22`r","SY(BUIREL04)","4","O","OTHER","32220"
"BUISGL","FUNCTN23`r","SY(BUIREL04)","4","O","OTHER","32220"

"BUISGL","FUNCTN24`r","SY(BUIREL04)","4","O","OTHER","32220"
"BUISGL","FUNCTN25`r","SY(BUIREL04)","4","O","OTHER","32220"
"BUISGL","FUNCTN26`r","SY(BUIREL05)","4","O","OTHER","32220"
"BUISGL","FUNCTN27`r","SY(BUIREL05)","4","O","OTHER","32220"
"BUISGL","FUNCTN33`r","SY(POSGEN03)","4","O","OTHER","32220"
"BUISGL","FUNCTN35`r","SY(TNKCON02)","4","O","OTHER","32220"
"CGUSTA","","SY(CGUSTA02)","7","O","OTHER","38030"
"CHKPNT","","","","","S","",""
"CRANES","","SY(CRANES01)","4","O","OTHER","32440"
"CTNARE","","SY(CHINFO06)","4","O","STANDARD","26050"

"CTRPNT","","SY(POSGEN04)","4","O","OTHER","32250"
"CTSARE","","SY(CHINFO07)","4","O","STANDARD","26250"
"CURENT","","","","S","",""
"CURENT","ORIENT`CURVEL`","SY(CURENT01,ORIENT);TE('%4.1lf kn',CURVEL,3,1,2,'15110',1,-1,CHBLK,31)","5","O","OTHER","33060"
"CURENT","ORIENT`","SY(CURENT01,ORIENT)","5","O","OTHER","33060"
"DAMCON","","","","S","",""
"DAMCON","CATDAM3","SY(CHINFO06)","4","O","STANDARD",22010"
"DAYMAR","","SY(DAYSQR21);TE('bn %s',OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","7","O","STANDARD","27025"
"DAYMAR","TOPSHP19`","SY(DAYSQR21);TE('bn %s',OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","7","O","STANDARD","27025"
"DAYMAR","TOPSHP20`","SY(DAYSQR21);TE('bn %s',OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","7","O","STANDARD","27025"
"DAYMAR","TOPSHP21`","SY(DAYSQR21);TE('bn %s',OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","7","O","STANDARD","27025"
"DAYMAR","TOPSHP24`","SY(DAYTRI21);TE('bn %s',OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","7","O","STANDARD","27025"
"DAYMAR","TOPSHP25`","SY(DAYTRI25);TE('bn %s',OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","7","O","STANDARD","27025"
"DISMAR","","SY(DISMAR03);TX(INFORM,2,1,2,'15110',2,0,CHBLK,21)","7","O","OTHER","32430"
"DISMAR","CATDIS1`","SY(DISMAR04);TX(INFORM,2,1,2,'15110',2,0,CHBLK,21)","7","O","OTHER","32430"
"DMPGRD","","SY(CHINFO07)","4","O","STANDARD","26240"
"FOGSIG","","SY(FOGSIG01)","6","O","STANDARD","27080"
"FORSTC","","SY(FORSTC01)","4","O","OTHER","32220"
"FORSTC","CONVIS1`","SY(FORSTC11)","4","O","STANDARD","22220"
"FSHFAC","","SY(FSHHAV01)","4","O","OTHER","34040"
"FSHFAC","CATFIF1`","SY(FSHFAC03)","4","O","OTHER","34040"
"FSHFAC","CATFIF2`","SY(FSHFAC02)","4","O","OTHER","34040"
"FSHFAC","CATFIF3`","SY(FSHFAC02)","4","O","OTHER","34040"
"FSHFAC","CATFIF4`","SY(FSHFAC02)","4","O","OTHER","34040"
"GATCON","","SY(GATCON04)","8","O","STANDARD","22010"
"GATCON","CATGAT2","SY(GATCON04)","8","O","STANDARD","22010"
"GATCON","CATGAT3`","SY(GATCON04)","8","O","OTHER","32440"
"GATCON","CATGAT4`","SY(GATCON03)","8","O","OTHER","32440"
"GRIDRN","","","","S","",""
"HRBFAC","","SY(CHINFO07)","4","O","OTHER","32410"
"HRBFAC","CATHAF1`","SY(ROLROL01)","4","O","OTHER","32410"
"HRBFAC","CATHAF4`","SY(HRBFAC09)","4","O","OTHER","32410"
"HRBFAC","CATHAF5`","SY(SMCFAC02)","4","O","OTHER","32410"
"HULKES","","SY(HULKES01)","5","O","DISPLAYBASE","12410"
"ICNARE","","SY(CHINFO07)","4","O","STANDARD","26250"
"LIGHTS","","CS(LIGHTS05)","8","O","STANDARD","27070"
"LITFLT","","SY(LITFLT01);TE('by %s',OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","DISPLAYBASE","17010"
"LITVES","","SY(LITVES01);TE('LtV %s',OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","DISPLAYBASE","17011"
"LNDARE","","SY(LNDARE01);CS(QUAPOS01)","4","O","DISPLAYBASE","12010"
"LNDELV","","SY(POSGEN04);TX(ELEVAT,3,2,2,'15110',1,-1,CHBLK,31)","4","O","OTHER","32010"
"LNDMRK","","SY(POSGEN01)","4","O","OTHER","32220"
"LNDMRK","CATLMK17`FUNCTN33`CONVIS1`","SY(TOWERS03);TX(OBJNAM,3,2,2,'15110',1,-1,CHBLK,26)","6","O","STANDARD","22220"
"LNDMRK","CATLMK15`FUNCTN20`CONVIS1`","SY(BUIREL13)","6","O","STANDARD","22220"
"LNDMRK","CATLMK15`FUNCTN21`CONVIS1`","SY(BUIREL13)","6","O","STANDARD","22220"
"LNDMRK","CATLMK17`FUNCTN20`CONVIS1`","SY(BUIREL13)","6","O","STANDARD","22220"
"LNDMRK","CATLMK17`FUNCTN21`CONVIS1`","SY(BUIREL13)","6","O","STANDARD","22220"
"LNDMRK","CATLMK20`FUNCTN20`CONVIS1`","SY(BUIREL13)","6","O","STANDARD","22220"
"LNDMRK","CATLMK20`FUNCTN21`CONVIS1`","SY(BUIREL13)","6","O","STANDARD","22220"
"LNDMRK","CATLMK20`FUNCTN26`CONVIS1`","SY(BUIREL15)","6","O","STANDARD","22220"
"LNDMRK","CATLMK20`FUNCTN27`CONVIS1`","SY(BUIREL15)","6","O","STANDARD","22220"
"LNDMRK","CATLMK17`FUNCTN33`","SY(TOWERS01);TX(OBJNAM,3,2,2,'15110',1,-1,CHBLK,26)","4","O","OTHER","32220"
"LNDMRK","CATLMK1`CONVIS1`","SY(CAIRNS11)","6","O","STANDARD","22220"
"LNDMRK","CATLMK3`CONVIS1`","SY(CHIMNY11)","6","O","STANDARD","22220"
"LNDMRK","CATLMK4`CONVIS1`","SY(DSHAER11)","6","O","STANDARD","22220"
"LNDMRK","CATLMK5`CONVIS1`","SY(FLGSTF01)","6","O","STANDARD","22220"
"LNDMRK","CATLMK6`CONVIS1`","SY(FLASTK11)","6","O","STANDARD","22220"
"LNDMRK","CATLMK7`CONVIS1`","SY(MSTCON14)","6","O","STANDARD","22220"
"LNDMRK","CATLMK8`CONVIS1`","SY(POSGEN03)","6","O","STANDARD","22220"
"LNDMRK","CATLMK9`CONVIS1`","SY(MONUMT12)","6","O","STANDARD","22220"
"LNDMRK","CATLMK10`CONVIS1`","SY(MONUMT12)","6","O","STANDARD","22220"
"LNDMRK","CATLMK12`CONVIS1`","SY(MONUMT12)","6","O","STANDARD","22220"
"LNDMRK","CATLMK13`CONVIS1`","SY(MONUMT12)","6","O","STANDARD","22220"
"LNDMRK","CATLMK15`CONVIS1`","SY(DOMES011)","6","O","STANDARD","22220"
"LNDMRK","CATLMK16`CONVIS1`","SY(RASCAN11)","6","O","STANDARD","22220"
"LNDMRK","CATLMK17`CONVIS1`","SY(TOWERS03)","6","O","STANDARD","22220"
"LNDMRK","CATLMK18`CONVIS1`","SY(WNDMIL12)","6","O","STANDARD","22220"
"LNDMRK","CATLMK19`CONVIS1`","SY(WIMCON11)","6","O","STANDARD","22220"
"LNDMRK","CATLMK20`CONVIS1`","SY(POSGEN03)","6","O","STANDARD","22220"
"LNDMRK","CATLMK20`FUNCTN20`","SY(BUIREL01)","4","O","OTHER","32220"
"LNDMRK","CATLMK1`","SY(CAIRNS01)","4","O","OTHER","32220"
"LNDMRK","CATLMK3`","SY(CHIMNY01)","4","O","OTHER","32220"
"LNDMRK","CATLMK4`","SY(DSHAER01)","4","O","OTHER","32220"
"LNDMRK","CATLMK5`","SY(FLGSTF01)","4","O","OTHER","32220"
"LNDMRK","CATLMK6`","SY(FLASTK01)","4","O","OTHER","32220"
"LNDMRK","CATLMK7`","SY(MSTCON04)","4","O","OTHER","32220"
"LNDMRK","CATLMK8`","SY(POSGEN03)","4","O","OTHER","32220"
"LNDMRK","CATLMK9`","SY(MONUMT02)","4","O","OTHER","32220"
"LNDMRK","CATLMK10`","SY(MONUMT02)","4","O","OTHER","32220"
"LNDMRK","CATLMK12`","SY(MONUMT02)","4","O","OTHER","32220"
"LNDMRK","CATLMK13`","SY(MONUMT02)","4","O","OTHER","32220"
"LNDMRK","CATLMK15`","SY(DOMES001)","4","O","OTHER","32220"
"LNDMRK","CATLMK16`","SY(RASCAN01)","4","O","OTHER","32220"
"LNDMRK","CATLMK17`","SY(TOWERS01)","4","O","OTHER","32220"
"LNDMRK","CATLMK18`","SY(WNDMIL02)","4","O","OTHER","32220"
"LNDMRK","CATLMK19`","SY(WIMCON01)","4","O","OTHER","32220"

"LNDMRK","CATLMK20\r","SY(POSGEN01)","4","O","OTHER","32220"
"LNDMRK","CONVIS1\r","SY(POSGEN03)","6","O","STANDARD","22220"
"LNDRGN","","SY(POSGEN04);TX(OBJNAM,1,2,2,'15110',0,-1,CHBLK,26)","4","O","STANDARD","21060"
"LOCMAG","","SY(LOCMAG01)","4","O","OTHER","31080"
"LOGPON","","","","S","",""
"M_NPUB","","SY(CHINFO07)","4","O","OTHER","31020"
"MAGVAR","","SY(MAGVAR01);TX(VALMAG,3,1,2,'15110',1,-1,CHBLK,27)","4","O","OTHER","31080"
"MARCUL","","SY(MARCUL02)","4","O","STANDARD","26210"
"MIPARE","","SY(CHINFO06)","4","O","STANDARD","26040"
"MORFAC","","SY(MORFAC03)","6","O","DISPLAYBASE","12410"
"MORFAC","CATMOR7\rBOYSHP3\r","SY(BOYMOR01)","8","O","DISPLAYBASE","17010"
"MORFAC","CATMOR7\rBOYSHP6\r","SY(BOYMOR03)","8","O","DISPLAYBASE","17010"
"MORFAC","CATMOR1\r","SY(MORFAC03)","6","O","DISPLAYBASE","12410"
"MORFAC","CATMOR2\r","SY(MORFAC04)","6","O","DISPLAYBASE","12410"
"MORFAC","CATMOR3\r","SY(PILPNT02)","6","O","OTHER","32440"
"MORFAC","CATMOR5\r","SY(PILPNT02)","6","O","DISPLAYBASE","12410"
"MORFAC","CATMOR7\r","SY(BOYMOR11)","8","O","DISPLAYBASE","17010"
"OBSTRN","","CS(OBSTRN04)","4","O","OTHER","34050"
"OBSTRN","CATOBS7\r","SY(FOULGND1)","4","O","OTHER","34050"
"OBSTRN","CATOBS9\r","SY(ACHARE02)","4","O","OTHER","34050"
"OFSPLF","","SY(OFSPLF01);TE('Prod %s','OBJNAM',3,1,2,'15110',1,-1,CHBLK,21)","5","O","DISPLAYBASE","12210"
"PILBOP","","SY(PILBOP02);TE('Plt %s','OBJNAM',3,1,2,'15110',1,-1,CHBLK,21)","6","O","STANDARD","28010"
"PILPNT","","SY(PILPNT02)","5","O","DISPLAYBASE","12410"
"PIPARE","","SY(CHINFO07)","4","O","STANDARD","26230"
"PIPSOL","","","","S","",""
"PRCARE","","SY(PRCARE12)","5","O","DISPLAYBASE","15010"
"PRDARE","","","","S","",""
"PRDARE","CATPRA5\rCONVIS1\r","SY(FLASTK11)","4","O","STANDARD","22220"
"PRDARE","CATPRA8\rCONVIS1\r","SY(TNKCON12)","4","O","STANDARD","22220"
"PRDARE","CATPRA9\rCONVIS1\r","SY(WIMCON11)","4","O","STANDARD","22220"
"PRDARE","CATPRA1\r","SY(PRDINS02)","3","O","OTHER","32270"
"PRDARE","CATPRA5\r","SY(FLASTK01)","3","O","OTHER","32270"
"PRDARE","CATPRA6\r","SY(TMBYRD01)","3","O","OTHER","32270"
"PRDARE","CATPRA8\r","SY(TNKCON02)","3","O","OTHER","32270"
"PRDARE","CATPRA9\r","SY(WIMCON01)","3","O","OTHER","32270"
"PYLONS","","SY(POSGEN03)","8","O","DISPLAYBASE","12210"
"RADRFL","","SY(RADRFL03)","6","O","STANDARD","27230"
"RADSTA","","SY(POSGEN01)","5","O","OTHER","38010"
"RADSTA","CATRAS2\r","SY(RDOSTA02);TE('ch %s','COMCHA',3,1,2,'15110',0,0,CHBLK,11)","5","O","OTHER","38010"
"RAPIDS","","","","S","",""
"RCTLPT","","SY(RTLDEF51)","4","O","DISPLAYBASE","15020"
"RCTLPT","ORIENT\r","SY(RCTLPT52,ORIENT)","4","O","DISPLAYBASE","15020"
"RDOCAL","","SY(RCLDEF01);TE('No %s','OBJNAM',3,2,2,'15110',1,-1,CHBLK,21)","6","O","DISPLAYBASE","15060"
"RDOCAL","TRAFIC1\rORIENT\r","SY(RDOCAL02,ORIENT);TE('No%s','OBJNAM',3,1,2,'15110',1,-1,CHBLK,21);TE('ch
%s','COMCHA',3,1,2,'15110',1,1,CHBLK,11)","6","O","DISPLAYBASE","15060"
"RDOCAL","TRAFIC2\rORIENT\r","SY(RDOCAL02,ORIENT);TE('No%s','OBJNAM',3,1,2,'15110',1,-1,CHBLK,21);TE('ch
%s','COMCHA',3,1,2,'15110',1,1,CHBLK,11)","6","O","DISPLAYBASE","15060"
"RDOCAL","TRAFIC3\rORIENT\r","SY(RDOCAL02,ORIENT);TE('No%s','OBJNAM',3,1,2,'15110',1,-1,CHBLK,21);TE('ch
%s','COMCHA',3,1,2,'15110',1,1,CHBLK,11)","6","O","DISPLAYBASE","15060"
"RDOCAL","TRAFIC4\rORIENT\r","SY(RDOCAL03,ORIENT);TE('No%s','OBJNAM',3,1,2,'15110',1,-1,CHBLK,21);TE('ch
%s','COMCHA',3,1,2,'15110',1,1,CHBLK,11)","6","O","DISPLAYBASE","15060"
"RDOSTA","","SY(RDOSTA02)","4","O","OTHER","38010"
"RETRFL","","SY(RETRFL01)","6","O","STANDARD","27080"
"ROADWY","","","","S","",""
"RSCSTA","","SY(RSCSTA02)","7","O","OTHER","38030"
"RTPBCN","","SY(RTPBCN02)","6","O","STANDARD","27210"
"RUNWAY","","","","S","",""
"SBDARE","","TX(NATSUR,1,2,2,'15110',0,0,CHBLK,25)","4","O","OTHER","34010"
"SEAARE","","TX(OBJNAM,1,2,3,'15110',0,0,CHBLK,26)","3","S","STANDARD","21060"
"SILTNK","","SY(TNKCON02)","4","O","OTHER","32220"
"SILTNK","CATSIL1\rCONVIS1\r","SY(SILBUI11)","4","O","STANDARD","22220"
"SILTNK","CATSIL2\rCONVIS1\r","SY(TNKCON12)","4","O","STANDARD","22220"
"SILTNK","CATSIL3\rCONVIS1\r","SY(TOWERS03)","4","O","STANDARD","22220"
"SILTNK","CATSIL4\rCONVIS1\r","SY(TOWERS12)","4","O","STANDARD","22220"

"SILTNK","CONVIS1\r","SY(TNKCON12)","4","O","STANDARD","22220"
"SILTNK","CATSIL1\r","SY(SILBUI01)","4","O","OTHER","32220"
"SILTNK","CATSIL2\r","SY(TNKCON02)","4","O","OTHER","32220"
"SILTNK","CATSIL3\r","SY(TOWERS01)","4","O","OTHER","32220"
"SILTNK","CATSIL4\r","SY(TOWERS02)","4","O","OTHER","32220"
"SISTAT","","SY(SISTAT02)","7","O","STANDARD","28020"
"SISTAW","","SY(SISTAT02)","7","O","STANDARD","28020"
"SLCONS","","SY(MORFAC03);CS(SLCONS03)","8","O","DISPLAYBASE","12410"
"SLOGRD","","SY(HILTOP01)","3","S","OTHER","32010"
"SLOTOP","","SY(HILTOP01)","3","S","OTHER","32010"
"SLOTOP","CONVIS1\r","SY(HILTOP11)","3","S","STANDARD","22220"
"SMCFAC","","","","S","",""
"SNDWAV","","SY(SNDWAV02)","4","O","STANDARD","24010"
"SOUNDG","","CS(SOUNDG02)","6","O","OTHER","33010"
"SPLARE","","SY(CHINFO06)","4","O","STANDARD","26040"
"SPRING","","SY(SPRING02)","4","O","OTHER","34020"
"T_HMON","","SY(TIDEHT01)","4","O","OTHER","33050"
"T_NHMN","","SY(TIDEHT01)","4","O","OTHER","33050"
"T_TIMS","","SY(TIDEHT01)","4","O","OTHER","33050"
"TS_FEB","","SY(CURDEF01)","4","O","OTHER","33060"

```
"TS_FEB","CAT_TS1›ORIENT›","SY(FLDSTR01,ORIENT);TE('%4.1lf kn','CURVEL',3,1,2,'15110',1,-1,CHBLK,31)","4","O","OTHER","33060"
"TS_FEB","CAT_TS2›ORIENT›","SY(EBBSTR01,ORIENT);TE('%4.1lf kn','CURVEL',3,1,2,'15110',1,-1,CHBLK,31)","4","O","OTHER","33060"
"TS_FEB","CAT_TS3›ORIENT›","SY(CURENT01,ORIENT);TE('%4.1lf kn','CURVEL',3,1,2,'15110',1,-1,CHBLK,31)","4","O","OTHER","33060"
"TS_PAD","","SY(TIDSTR01)","4","O","OTHER","33060"
"TS_PNH","","SY(TIDSTR01)","4","O","OTHER","33060"
"TS_PRH","","SY(TIDSTR01)","4","O","OTHER","33060"
"TS_TIS","","SY(TIDSTR01)","4","O","OTHER","33060"
"TOPMAR","","CS(TOPMAR01)","6","O","STANDARD","27050"
"TUNNEL","","","","S","",""
"UWTROC","","CS(OBSTRN04)","4","O","OTHER","34050"
"VEGATN","","","","S","",""
"WATFAL","","","","S","",""
"WATTUR","","SY(WATTUR02)","3","O","OTHER","33040"
"WEDKLP","","SY(WEDKLP03)","3","O","OTHER","34020"
"WRECKS","","CS(WRECKS02)","4","O","OTHER","34050"
"WRECKS","CATWRK3›","SY(FOULGND1)","4","O","OTHER","34050"
*
* ***                          ***
* *** section two: NON-STANDARD CLASSES ***
* ***                          ***
*
*Note: category "DISPLAYBASE" should not be removed from the display.
*For non-standard classes, all category "MARINERS STANDARD" and "MARINERS OTHER"
*should be drawn when "STANDARD DISPLAY" is drawn, and therefore may be re-assigned
*to the category of choosen by the mariner.
*
"cursor","","SY(CURSRA01)","8","O","DISPLAYBASE","11010"
"cursor","cursty2›","SY(CURSRB01)","8","O","MARINERS OTHER","61040"
"dnghlt","","SY(DNGHILIT)","8","O","MARINERS STANDARD","53010"
"events","","SY(EVENTS02);TX(OBJNAM,3,2,3,'15110',1,0,CHBLK,50)","8","O","MARINERS STANDARD","52410"
"marfea","","SY(CHINFO09);TX(OBJNAM,3,1,3,'15110',1,-1,CHBLK,50)","8","O","MARINERS STANDARD","53050"
"marnot","","SY(CHINFO09);TX(usrmrk,3,1,2,'15110',0,0,CHBLK,50)","8","O","MARINERS STANDARD","53040"
"marnot","catnot1›","SY(CHINFO08);TX(usrmrk,3,1,2,'15110',0,0,CHBLK,50)","8","O","MARINERS STANDARD","53030"
"marnot","catnot2›","SY(CHINFO09);TX(usrmrk,3,1,2,'15110',0,0,CHBLK,50)","8","O","MARINERS STANDARD","53040"
"mnufea","","SY(CHINFO10)","5","O","MARINERS STANDARD","55010"
"mnufea","catnot1›","SY(CHINFO10)","5","O","MARINERS STANDARD","55010"
"mnufea","catnot2›","SY(CHINFO11)","5","O","MARINERS STANDARD","55020"
"ownshp","","CS(OWNSHP02)","9","O","DISPLAYBASE","42010"
"plnpos","","SY(PLNPOS01);SY(PLNPOS02,ORIENT);TX(plndat,1,2,2,'15110',4,3,CHBLK,50);","5","O","MARINERS STANDARD","52030"
"positn","","SY(POSITN02);TX(loctim,1,1,2,'15110',0,-1,CHBLK,50)","5","O","MARINERS OTHER","62010"
"positn","pfmeth1›","SY(POSITN02);TX('DR',2,3,2,'15110',-1,1,CHBLK,50);TX(loctim,1,1,2,'15110',0,-1,CHBLK,50)","5","O","MARINERS OTHER","62010"
"positn","pfmeth2›","SY(POSITN02);TX('EP',2,3,2,'15110',-1,1,CHBLK,50);TX(loctim,1,1,2,'15110',0,-1,CHBLK,50)","5","O","MARINERS OTHER","62010"
"positn","pfmeth3›","SY(POSITN02);TX('V',3,3,2,'15110',1,1,CHBLK,50);TX(loctim,1,1,2,'15110',0,-1,CHBLK,50)","5","O","MARINERS OTHER","62010"
"positn","pfmeth4›","SY(POSITN02);TX('A',3,3,2,'15110',1,1,CHBLK,50);TX(loctim,1,1,2,'15110',0,-1,CHBLK,50)","5","O","MARINERS OTHER","62010"
"positn","pfmeth5›","SY(POSITN02);TX('R',3,3,2,'15110',1,1,CHBLK,50);TX(loctim,1,1,2,'15110',0,-1,CHBLK,50)","5","O","MARINERS OTHER","62010"
"positn","pfmeth6›","SY(POSITN02);TX('D',3,3,2,'15110',1,1,CHBLK,50);TX(loctim,1,1,2,'15110',0,-1,CHBLK,50)","5","O","MARINERS OTHER","62010"
"positn","pfmeth7›","SY(POSITN02);TX('G',3,3,2,'15110',1,1,CHBLK,50);TX(loctim,1,1,2,'15110',0,-1,CHBLK,50)","5","O","MARINERS OTHER","62010"
"positn","pfmeth8›","SY(POSITN02);TX('Gl',3,3,2,'15110',1,1,CHBLK,50);TX(loctim,1,1,2,'15110',0,-1,CHBLK,50)","5","O","MARINERS OTHER","62010"
"positn","pfmeth9›","SY(POSITN02);TX('L',3,3,2,'15110',1,1,CHBLK,50);TX(loctim,1,1,2,'15110',0,-1,CHBLK,50)","5","O","MARINERS OTHER","62010"
"positn","pfmeth10›","SY(POSITN02);TX('M',3,3,2,'15110',1,1,CHBLK,50);TX(loctim,1,1,2,'15110',0,-1,CHBLK,50)","5","O","MARINERS OTHER","62010"
"positn","pfmeth11›","SY(POSITN02);TX('O',3,3,2,'15110',1,1,CHBLK,50);TX(loctim,1,1,2,'15110',0,-1,CHBLK,50)","5","O","MARINERS OTHER","62010"
"positn","pfmeth12›","SY(POSITN02);TX('T',3,3,2,'15110',1,1,CHBLK,50);TX(loctim,1,1,2,'15110',0,-1,CHBLK,50)","5","O","MARINERS OTHER","62010"
"positn","pfmeth13›","SY(POSITN02);TX('dG',3,3,2,'15110',1,1,CHBLK,50);TX(loctim,1,1,2,'15110',0,-1,CHBLK,50)","5","O","MARINERS OTHER","62010"
"positn","pfmeth14›","SY(POSITN02);TX('dGl',3,3,2,'15110',1,1,CHBLK,50);TX(loctim,1,1,2,'15110',0,-1,CHBLK,50)","5","O","MARINERS OTHER","62010"
"positn","pfmeth15›","SY(POSITN02);TX('dO',3,3,2,'15110',1,1,CHBLK,50);TX(loctim,1,1,2,'15110',0,-1,CHBLK,50)","5","O","MARINERS OTHER","62010"
"refpnt","","SY(REFPNT02)","7","O","MARINERS OTHER","61050"
"tidcur","","SY(TIDCUR01,ORIENT);SY(TIDCUR03);TX(curstr,2,3,2,'15110',-1,2,CHBLK,50);TX(loctim,3,1,2,'15110',1,-2,CHBLK,50)","7","O","MARINERS
STANDARD","53080"
"tidcur","catcur1›","SY(TIDCUR01,ORIENT);SY(TIDCUR03);TX('P',2,3,2,'15110',-4,2,CHBLK,50);TX(curstr,2,3,2,'15110',-1,2,CHBLK,50);TX(loctim,3,1,2,'15110',1,-2
,CHBLK,50)","7","O","MARINERS STANDARD","53080"
"tidcur","catcur2›","SY(TIDCUR02,ORIENT);SY(TIDCUR03);TX('A',2,3,2,'15110',-4,2,CHBLK,50);TX(curstr,2,3,2,'15110',-1,2,CHBLK,50);TX(loctim,3,1,2,'15110',1,-
2,CHBLK,50)","7","O","MARINERS STANDARD","53080"
"vessel","","CS(VESSEL01)","9","O","MARINERS STANDARD","54030"
"waypnt","","SY(WAYPNT11);TX(OBJNAM,3,1,3,'15110',1,-1,APLRT,50)","8","O","DISPLAYBASE","42210"
"waypnt","select1›","SY(WAYPNT11);TX(OBJNAM,3,1,3,'15110',1,-1,CHBLK,50)","8","O","DISPLAYBASE","42210"
"waypnt","select2›","SY(WAYPNT03);TX(OBJNAM,3,1,3,'15110',1,-1,APLRT,50)","8","O","MARINERS STANDARD","52210"
*
* ***                          ***
* *** end of look-up table ***
* ***                          ***
```

### 11.1.2 Look-up table for simplified point symbolisation

```
* *** SIMPLIFIED POINTS                    ***
* *** This is the look-up table for point symbolization. ***
* *** For edition 3.2 Preslib, dated March  2000        ***
```

```
*
* Each line contains minimum 6 fields:
*  1. field - code of the object class
*  2. field - attribute combination
*  3. field - symbolization instruction
*  4. field - display priority
*  5. field - radar
*  6. field - IMO display category
*  7. field - viewing group (optional)
*
* Each field entry is framed by "'" and fields are separated by ','.
*
* Please note, that the entries to this table must be in
* alphabetic order (sorted by the class code).
*
* This table has 2 sections:
*
* - The first section contains symbolization instructions for
*   standard S-57 'real world' objects:
* - The second section contains symbolization instructions for
*   non-standard (class code in lowercase) objects:
*
* default for symbolization failure; must be the first entry to look-up table
"######","","SY(QUESMRK1)","5","O","STANDARD","21010"
*
* ***                         ***
* *** section one: REAL WORLD CLASSES ***
* ***                         ***
*
"ACHARE","","SY(ACHARE02)","6","O","STANDARD","26220"
"ACHBRT","","SY(ACHBRT07);TE('No %s','OBJNAM',3,1,2,'15110',1,0,CHBLK,29)","5","O","STANDARD","26220"
"AIRARE","","SY(AIRARE02)","4","O","OTHER","32240"
"BCNCAR","","SY(BCNDEF13);TE('bn %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","DISPLAYBASE","17020"
"BCNCAR","CATCAM4`r","SY(BCNCAR04);TE('bn %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","DISPLAYBASE","17020"
"BCNCAR","CATCAM3`r","SY(BCNCAR03);TE('bn %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","DISPLAYBASE","17020"
"BCNCAR","CATCAM2`r","SY(BCNCAR02);TE('bn %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","DISPLAYBASE","17020"
"BCNCAR","CATCAM1`r","SY(BCNCAR01);TE('bn %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","DISPLAYBASE","17020"
"BCNISD","","SY(BCNISD21);TE('bn %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","DISPLAYBASE","17020"
"BCNLAT","","SY(BCNDEF13);TE('bn %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","DISPLAYBASE","17020"
"BCNLAT","COLOUR3,4,3`rBCNSHP1`r","SY(BCNLAT21);TE('bn %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","DISPLAYBASE","17020"
"BCNLAT","COLOUR3,4,3`rBCNSHP2`r","SY(BCNLAT21);TE('bn %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","DISPLAYBASE","17020"
"BCNLAT","COLOUR3,4,3`rBCNSHP7`r","SY(BCNLAT21);TE('bn %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","DISPLAYBASE","17020"
"BCNLAT","COLOUR4,3,4`rBCNSHP1`r","SY(BCNLAT22);TE('bn %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","DISPLAYBASE","17020"
"BCNLAT","COLOUR4,3,4`rBCNSHP2`r","SY(BCNLAT22);TE('bn %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","DISPLAYBASE","17020"
"BCNLAT","COLOUR4,3,4`rBCNSHP7`r","SY(BCNLAT22);TE('bn %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","DISPLAYBASE","17020"

"BCNLAT","COLOUR3,4,3`rBCNSHP3`r","SY(BCNLAT15);TE('bn %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","DISPLAYBASE","17020"
"BCNLAT","COLOUR3,4,3`rBCNSHP4`r","SY(BCNLAT15);TE('bn %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","DISPLAYBASE","17020"
"BCNLAT","COLOUR3,4,3`rBCNSHP5`r","SY(BCNLAT15);TE('bn %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","DISPLAYBASE","17020"
"BCNLAT","COLOUR4,3,4`rBCNSHP3`r","SY(BCNLAT16);TE('bn %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","DISPLAYBASE","17020"
"BCNLAT","COLOUR4,3,4`rBCNSHP4`r","SY(BCNLAT16);TE('bn %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","DISPLAYBASE","17020"
"BCNLAT","COLOUR4,3,4`rBCNSHP5`r","SY(BCNLAT16);TE('bn %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","DISPLAYBASE","17020"
"BCNLAT","COLOUR4,3,4`rBCNSHP6`r","SY(BCNLAT16);TE('bn %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","DISPLAYBASE","17020"
"BCNLAT","COLOUR3,4,3`r","SY(BCNLAT15);TE('bn %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","DISPLAYBASE","17020"
"BCNLAT","COLOUR4,3,4`r","SY(BCNLAT16);TE('bn %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","DISPLAYBASE","17020"
"BCNLAT","COLOUR3`rBCNSHP1`r","SY(BCNLAT21);TE('bn %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","DISPLAYBASE","17020"
"BCNLAT","COLOUR3`rBCNSHP2`r","SY(BCNLAT21);TE('bn %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","DISPLAYBASE","17020"
"BCNLAT","COLOUR3`rBCNSHP7`r","SY(BCNLAT21);TE('bn %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","DISPLAYBASE","17020"
"BCNLAT","COLOUR4`rBCNSHP1`r","SY(BCNLAT22);TE('bn %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","DISPLAYBASE","17020"
"BCNLAT","COLOUR4`rBCNSHP2`r","SY(BCNLAT22);TE('bn %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","DISPLAYBASE","17020"
"BCNLAT","COLOUR4`rBCNSHP7`r","SY(BCNLAT22);TE('bn %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","DISPLAYBASE","17020"
"BCNLAT","COLOUR3`rBCNSHP3`r","SY(BCNLAT15);TE('bn %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","DISPLAYBASE","17020"
"BCNLAT","COLOUR3`rBCNSHP4`r","SY(BCNLAT15);TE('bn %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","DISPLAYBASE","17020"
"BCNLAT","COLOUR3`rBCNSHP5`r","SY(BCNLAT15);TE('bn %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","DISPLAYBASE","17020"
"BCNLAT","COLOUR4`rBCNSHP3`r","SY(BCNLAT16);TE('bn %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","DISPLAYBASE","17020"
"BCNLAT","COLOUR4`rBCNSHP4`r","SY(BCNLAT16);TE('bn %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","DISPLAYBASE","17020"
"BCNLAT","COLOUR4`rBCNSHP5`r","SY(BCNLAT16);TE('bn %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","DISPLAYBASE","17020"
"BCNLAT","COLOUR3`r","SY(BCNLAT15);TE('bn %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","DISPLAYBASE","17020"
"BCNLAT","COLOUR4`r","SY(BCNLAT16);TE('bn %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","DISPLAYBASE","17020"
"BCNSAW","","SY(BCNSAW13);TE('bn %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","DISPLAYBASE","17020"
"BCNSAW","BCNSHP1`r","SY(BCNSAW21);TE('bn %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","DISPLAYBASE","17020"
"BCNSAW","BCNSHP2`r","SY(BCNSAW21);TE('bn %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","DISPLAYBASE","17020"
"BCNSAW","BCNSHP7`r","SY(BCNSAW21);TE('bn %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","DISPLAYBASE","17020"
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"BCNSAW","BCNSHP3`ſ","SY(BCNSAW13);TE('bn %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","DISPLAYBASE","17020"
"BCNSAW","BCNSHP4`ſ","SY(BCNSAW13);TE('bn %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","DISPLAYBASE","17020"
"BCNSAW","BCNSHP5`ſ","SY(BCNSAW13);TE('bn %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","DISPLAYBASE","17020"
"BCNSPP","","SY(BCNSPP21);TE('bn %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","DISPLAYBASE","17020"
"BCNSPP","BCNSHP6`ſCONVIS1`ſ","SY(CAIRNS11);TE('bn %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","DISPLAYBASE","17020"
"BCNSPP","CATSPM18`ſ","SY(NOTBRD11);TE('bn %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","DISPLAYBASE","17020"
"BCNSPP","CATSPM44`ſ","SY(BCNSPP13);TE('bn %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","DISPLAYBASE","17020"
"BCNSPP","CATSPM52`ſ","SY(BCNDEF13);TE('bn %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","DISPLAYBASE","17020"
"BCNSPP","BCNSHP1`ſ","SY(BCNSPP21);TE('bn %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","DISPLAYBASE","17020"
"BCNSPP","BCNSHP3`ſ","SY(BCNSPP13);TE('bn %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","DISPLAYBASE","17020"
"BCNSPP","BCNSHP4`ſ","SY(BCNSPP13);TE('bn %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","DISPLAYBASE","17020"
"BCNSPP","BCNSHP5`ſ","SY(BCNSPP13);TE('bn %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","DISPLAYBASE","17020"
"BCNSPP","BCNSHP6`ſ","SY(CAIRNS01);TE('bn %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","DISPLAYBASE","17020"
"BCNSPP","BCNSHP7`ſ","SY(BCNSPP21);TE('bn %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","DISPLAYBASE","17020"
"BERTHS","","SY(BRTHNO01);TE('No %s','OBJNAM',3,1,2,'15110',1,0,CHBLK,29)","3","O","OTHER","32440"
"BOYCAR","","SY(BOYDEF03);TE('by %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","DISPLAYBASE","17010"
"BOYCAR","CATCAM4`ſ","SY(BOYCAR04);TE('by %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","DISPLAYBASE","17010"
"BOYCAR","CATCAM3`ſ","SY(BOYCAR03);TE('by %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","DISPLAYBASE","17010"
"BOYCAR","CATCAM2`ſ","SY(BOYCAR02);TE('by %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","DISPLAYBASE","17010"
"BOYCAR","CATCAM1`ſ","SY(BOYCAR01);TE('by %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","DISPLAYBASE","17010"
"BOYINB","","SY(BOYMOR11);TE('by %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","DISPLAYBASE","17010"
"BOYISD","","SY(BOYISD12);TE('by %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","DISPLAYBASE","17010"
"BOYLAT","","SY(BOYDEF03);TE('by %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","DISPLAYBASE","17010"
"BOYLAT","BOYSHP1`ſCOLOUR3,4,3`ſ","SY(BOYLAT14);TE('by %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","DISPLAYBASE","17010"
"BOYLAT","BOYSHP1`ſCOLOUR4,3,4`ſ","SY(BOYLAT13);TE('by %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","DISPLAYBASE","17010"
"BOYLAT","BOYSHP2`ſCOLOUR3,4,3`ſ","SY(BOYLAT24);TE('by %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","DISPLAYBASE","17010"
"BOYLAT","BOYSHP2`ſCOLOUR4,3,4`ſ","SY(BOYLAT23);TE('by %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","DISPLAYBASE","17010"
"BOYLAT","CATLAM3`ſCOLOUR3,4,3`ſ","SY(BOYLAT24);TE('by %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","DISPLAYBASE","17010"
"BOYLAT","CATLAM3`ſCOLOUR4,3,4`ſ","SY(BOYLAT23);TE('by %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","DISPLAYBASE","17010"
"BOYLAT","CATLAM4`ſCOLOUR3,4,3`ſ","SY(BOYLAT14);TE('by %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","DISPLAYBASE","17010"
"BOYLAT","CATLAM4`ſCOLOUR4,3,4`ſ","SY(BOYLAT13);TE('by %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","DISPLAYBASE","17010"
"BOYLAT","BOYSHP1`ſCOLOUR3`ſ","SY(BOYLAT14);TE('by %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","DISPLAYBASE","17010"
"BOYLAT","BOYSHP1`ſCOLOUR4`ſ","SY(BOYLAT13);TE('by %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","DISPLAYBASE","17010"
"BOYLAT","BOYSHP2`ſCOLOUR3`ſ","SY(BOYLAT24);TE('by %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","DISPLAYBASE","17010"
"BOYLAT","BOYSHP2`ſCOLOUR4`ſ","SY(BOYLAT23);TE('by %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","DISPLAYBASE","17010"
"BOYLAT","CATLAM1`ſCOLOUR3`ſ","SY(BOYLAT24);TE('by %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","DISPLAYBASE","17010"
"BOYLAT","CATLAM1`ſCOLOUR4`ſ","SY(BOYLAT23);TE('by %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","DISPLAYBASE","17010"
"BOYLAT","CATLAM2`ſCOLOUR3`ſ","SY(BOYLAT14);TE('by %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","DISPLAYBASE","17010"
"BOYLAT","CATLAM2`ſCOLOUR4`ſ","SY(BOYLAT13);TE('by %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","DISPLAYBASE","17010"
"BOYSAW","","SY(BOYSAW12);TE('by %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","DISPLAYBASE","17010"
"BOYSPP","","SY(BOYSPP11);TE('by %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","DISPLAYBASE","17010"
"BOYSPP","CATSPM19`ſBOYSHP1`ſ","SY(BOYSPP15);TE('by %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","DISPLAYBASE","17010"
"BOYSPP","CATSPM19`ſBOYSHP2`ſ","SY(BOYSPP25);TE('by %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","DISPLAYBASE","17010"
"BOYSPP","CATSPM9`ſ","SY(BOYSUP02);TE('by %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","DISPLAYBASE","17010"
"BOYSPP","CATSPM15`ſ","SY(BOYSUP02);TE('by %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","DISPLAYBASE","17010"
"BOYSPP","CATSPM52`ſ","SY(BOYDEF03);TE('by %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","DISPLAYBASE","17010"
"BOYSPP","BOYSHP7`ſ","SY(BOYSUP02);TE('by %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","DISPLAYBASE","17010"
"BRIDGE","","","","S","",""
"BUAARE","","SY(BUAARE02);TX(OBJNAM,3,2,2,'15110',1,0,CHBLK,26)","3","O","STANDARD","22240"
"BUISGL","","SY(BUISGL01)","4","O","OTHER","32220"
"BUISGL","FUNCTN33`ſCONVIS1`ſOBJNAM`ſ","SY(POSGEN03);TX(OBJNAM,3,2,2,'15110',1,0,CHBLK,26)","6","O","STANDARD","22220"
"BUISGL","FUNCTN20`ſCONVIS1`ſ","SY(BUIREL13)","6","O","STANDARD","22220"
"BUISGL","FUNCTN21`ſCONVIS1`ſ","SY(BUIREL13)","6","O","STANDARD","22220"
"BUISGL","FUNCTN22`ſCONVIS1`ſ","SY(BUIREL14)","6","O","STANDARD","22220"
"BUISGL","FUNCTN23`ſCONVIS1`ſ","SY(BUIREL14)","6","O","STANDARD","22220"
"BUISGL","FUNCTN24`ſCONVIS1`ſ","SY(BUIREL14)","6","O","STANDARD","22220"
"BUISGL","FUNCTN25`ſCONVIS1`ſ","SY(BUIREL14)","6","O","STANDARD","22220"
"BUISGL","FUNCTN26`ſCONVIS1`ſ","SY(BUIREL15)","6","O","STANDARD","22220"
"BUISGL","FUNCTN27`ſCONVIS1`ſ","SY(BUIREL15)","6","O","STANDARD","22220"
"BUISGL","FUNCTN33`ſCONVIS1`ſ","SY(POSGEN03)","6","O","STANDARD","22220"
"BUISGL","FUNCTN35`ſCONVIS1`ſ","SY(TNKCON12)","6","O","STANDARD","22220"
"BUISGL","FUNCTN33`ſOBJNAM`ſ","SY(POSGEN03);TX(OBJNAM,3,2,2,'15110',1,0,CHBLK,26)","4","O","OTHER","32220"
"BUISGL","CONVIS1`ſ","SY(BUISGL11)","6","O","STANDARD","22220"
"BUISGL","FUNCTN20`ſ","SY(BUIREL01)","4","O","OTHER","32220"
"BUISGL","FUNCTN21`ſ","SY(BUIREL01)","4","O","OTHER","32220"
"BUISGL","FUNCTN22`ſ","SY(BUIREL04)","4","O","OTHER","32220"
"BUISGL","FUNCTN23`ſ","SY(BUIREL04)","4","O","OTHER","32220"
"BUISGL","FUNCTN24`ſ","SY(BUIREL04)","4","O","OTHER","32220"
"BUISGL","FUNCTN25`ſ","SY(BUIREL04)","4","O","OTHER","32220"
"BUISGL","FUNCTN26`ſ","SY(BUIREL05)","4","O","OTHER","32220"
"BUISGL","FUNCTN27`ſ","SY(BUIREL05)","4","O","OTHER","32220"
"BUISGL","FUNCTN33`ſ","SY(POSGEN03)","4","O","OTHER","32220"
"BUISGL","FUNCTN35`ſ","SY(TNKCON02)","4","O","OTHER","32220"
"CGUSTA","","SY(CGUSTA02)","7","O","OTHER","38030"
"CHKPNT","","","","S","",""
"CRANES","","SY(CRANES01)","4","O","OTHER","32440"
"CTNARE","","SY(CHINFO06)","4","O","STANDARD","26050"
"CTRPNT","","SY(POSGEN04)","4","O","OTHER","32250"
"CTSARE","","SY(CHINFO07)","4","O","STANDARD","26250"
"CURENT","","","","S","",""
"CURENT","ORIENT`ſCURVEL`ſ","SY(CURENT01,ORIENT);TE('%4.1lf kn','CURVEL',3,1,2,'15110',1,-1,CHBLK,31)","5","O","OTHER","33060"
"CURENT","ORIENT□","SY(CURENT01,ORIENT)","5","O","OTHER","33060"
"DAMCON","","","","S","",""
"DAMCON","CATDAM3","SY(CHINFO06)","4","O", "STANDARD","22010"
"DAYMAR","","SY(DAYSQR01);TE('bn %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","7","O","STANDARD","27025"

"DAYMAR","TOPSHP19□","SY(DAYSQR01);TE('bn %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","7","O","STANDARD","27025"
"DAYMAR","TOPSHP20\r","SY(DAYSQR01);TE('bn %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","7","O","STANDARD","27025"
"DAYMAR","TOPSHP21\r","SY(DAYSQR01);TE('bn %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","7","O","STANDARD","27025"
"DAYMAR","TOPSHP24\r","SY(DAYTRI01);TE('bn %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","7","O","STANDARD","27025"
"DAYMAR","TOPSHP25\r","SY(DAYTRI05);TE('bn %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","7","O","STANDARD","27025"
"DISMAR","","SY(DISMAR03);TX(INFORM,2,1,2,'15110',2,0,CHBLK,21)","7","O","OTHER","32430"
"DISMAR","CATDIS1\r","SY(DISMAR04);TX(INFORM,2,1,2,'15110',2,0,CHBLK,21)","7","O","OTHER","32430"
"DMPGRD","","SY(CHINFO07)","4","O","STANDARD","26240"
"FOGSIG","","SY(FOGSIG01)","6","O","STANDARD","27080"
"FORSTC","","SY(FORSTC01)","4","O","OTHER","32220"
"FORSTC","CONVIS1\r","SY(FORSTC11)","4","O","STANDARD","22220"
"FSHFAC","","SY(FSHHAV01)","4","O","OTHER","34040"
"FSHFAC","CATFIF1\r","SY(FSHFAC03)","4","O","OTHER","34040"
"FSHFAC","CATFIF2\r","SY(FSHFAC02)","4","O","OTHER","34040"
"FSHFAC","CATFIF3□","SY(FSHFAC02)","4","O","OTHER","34040"
"FSHFAC","CATFIF4□","SY(FSHFAC02)","4","O","OTHER","34040"
"GATCON","","SY(GATCON04)","8","O", "STANDARD","22010"
"GATCON","CATGAT2","SY(GATCON04)","8","O", "STANDARD","22010"
"GATCON","CATGAT3□","SY(GATCON04)","8","O","OTHER","32440"
"GATCON","CATGAT4□","SY(GATCON03)","8","O","OTHER","32440"
"GRIDRN","","","","S","",""
"HRBFAC","","SY(CHINFO07)","4","O","OTHER","32410"
"HRBFAC","CATHAF1□","SY(ROLROL01)","4","O","OTHER","32410"
"HRBFAC","CATHAF4\r","SY(HRBFAC09)","4","O","OTHER","32410"
"HRBFAC","CATHAF5\r","SY(SMCFAC02)","4","O","OTHER","32410"
"HULKES","","SY(HULKES01)","5","O","DISPLAYBASE","12410"
"ICNARE","","SY(CHINFO07)","4","O","STANDARD","26250"
"LIGHTS","","CS(LIGHTS05)","8","O","STANDARD","27070"
"LITFLT","","SY(LITFLT02);TE('by %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","DISPLAYBASE","17010"
"LITVES","","SY(LITVES02);TE('LtV %s','OBJNAM',2,1,2,'15110',-1,-1,CHBLK,21)","8","O","DISPLAYBASE","17011"
"LNDARE","","SY(LNDARE01);CS(QUAPOS01)","4","O","DISPLAYBASE","12010"
"LNDELV","","SY(POSGEN04);TX(ELEVAT,3,2,2,'15110',1,-1,CHBLK,31)","4","O","OTHER","32010"
"LNDMRK","","SY(POSGEN01)","4","O","OTHER","32220"
"LNDMRK","CATLMK17\rFUNCTN33\rCONVIS1\r","SY(TOWERS03);TX(OBJNAM,3,2,2,'15110',1,-1,CHBLK,26)","6","O","STANDARD","22220"
"LNDMRK","CATLMK15\rFUNCTN20\rCONVIS1\r","SY(BUIREL13)","6","O","STANDARD","22220"
"LNDMRK","CATLMK15\rFUNCTN21\rCONVIS1\r","SY(BUIREL13)","6","O","STANDARD","22220"
"LNDMRK","CATLMK17\rFUNCTN20\rCONVIS1\r","SY(BUIREL13)","6","O","STANDARD","22220"
"LNDMRK","CATLMK17\rFUNCTN21\rCONVIS1\r","SY(BUIREL13)","6","O","STANDARD","22220"
"LNDMRK","CATLMK20\rFUNCTN20\rCONVIS1\r","SY(BUIREL13)","6","O","STANDARD","22220"
"LNDMRK","CATLMK20\rFUNCTN21\rCONVIS1\r","SY(BUIREL13)","6","O","STANDARD","22220"
"LNDMRK","CATLMK20\rFUNCTN26\rCONVIS1\r","SY(BUIREL15)","6","O","STANDARD","22220"
"LNDMRK","CATLMK20\rFUNCTN27\rCONVIS1\r","SY(BUIREL15)","6","O","STANDARD","22220"
"LNDMRK","CATLMK17\rFUNCTN33\r","SY(TOWERS01);TX(OBJNAM,3,2,2,'15110',1,-1,CHBLK,26)","4","O","OTHER","32220"
"LNDMRK","CATLMK1\rCONVIS1\r","SY(CAIRNS11)","6","O","STANDARD","22220"
"LNDMRK","CATLMK3\rCONVIS1\r","SY(CHIMNY11)","6","O","STANDARD","22220"
"LNDMRK","CATLMK4\rCONVIS1\r","SY(DSHAER11)","6","O","STANDARD","22220"

"LNDMRK","CATLMK5\rCONVIS1\r","SY(FLGSTF01)","6","O","STANDARD","22220"
"LNDMRK","CATLMK6\rCONVIS1\r","SY(FLASTK11)","6","O","STANDARD","22220"
"LNDMRK","CATLMK7\rCONVIS1\r","SY(MSTCON14)","6","O","STANDARD","22220"
"LNDMRK","CATLMK8\rCONVIS1\r","SY(POSGEN03)","6","O","STANDARD","22220"
"LNDMRK","CATLMK9\rCONVIS1\r","SY(MONUMT12)","6","O","STANDARD","22220"
"LNDMRK","CATLMK10\rCONVIS1\r","SY(MONUMT12)","6","O","STANDARD","22220"
"LNDMRK","CATLMK12\rCONVIS1\r","SY(MONUMT12)","6","O","STANDARD","22220"
"LNDMRK","CATLMK13\rCONVIS1\r","SY(MONUMT12)","6","O","STANDARD","22220"
"LNDMRK","CATLMK15\rCONVIS1\r","SY(DOMES011)","6","O","STANDARD","22220"
"LNDMRK","CATLMK16\rCONVIS1\r","SY(RASCAN11)","6","O","STANDARD","22220"
"LNDMRK","CATLMK17\rCONVIS1\r","SY(TOWERS03)","6","O","STANDARD","22220"
"LNDMRK","CATLMK18\rCONVIS1\r","SY(WNDMIL12)","6","O","STANDARD","22220"
"LNDMRK","CATLMK19\rCONVIS1\r","SY(WIMCON11)","6","O","STANDARD","22220"
"LNDMRK","CATLMK20\rCONVIS1\r","SY(POSGEN03)","6","O","STANDARD","22220"
"LNDMRK","CATLMK15\rFUNCTN20\r","SY(BUIREL01)","4","O","OTHER","32220"
"LNDMRK","CATLMK17\rFUNCTN20\r","SY(BUIREL01)","4","O","OTHER","32220"
"LNDMRK","CATLMK20\rFUNCTN20\r","SY(BUIREL01)","4","O","OTHER","32220"
"LNDMRK","CATLMK3\r","SY(CHIMNY01)","4","O","OTHER","32220"
"LNDMRK","CATLMK6\r","SY(FLASTK01)","4","O","OTHER","32220"
"LNDMRK","CATLMK7\r","SY(MSTCON04)","4","O","OTHER","32220"
"LNDMRK","CATLMK15\r","SY(DOMES001)","4","O","OTHER","32220"
"LNDMRK","CATLMK16\r","SY(RASCAN01)","4","O","OTHER","32220"
"LNDMRK","CATLMK17\r","SY(TOWERS01)","4","O","OTHER","32220"
"LNDMRK","CONVIS1\r","SY(POSGEN03)","6","O","STANDARD","22220"
"LNDRGN","","SY(POSGEN04);TX(OBJNAM,1,2,2,'15110',0,-1,CHBLK,26)","4","O","STANDARD","21060"
"LOCMAG","","SY(LOCMAG01)","4","O","OTHER","31080"
"LOGPON","","","","S","",""
"M_NPUB","","SY(CHINFO07)","4","O","OTHER","31020"
"MAGVAR","","SY(MAGVAR01);TX(VALMAG,3,1,2,'15110',1,-1,CHBLK,27)","4","O","OTHER","31080"
"MARCUL","","SY(MARCUL02)","4","O","STANDARD","26210"
"MIPARE","","SY(CHINFO06)","4","O","STANDARD","26040"
"MORFAC","","SY(MORFAC03)","6","O","DISPLAYBASE","12410"
"MORFAC","CATMOR1\r","SY(MORFAC03)","6","O","DISPLAYBASE","12410"
"MORFAC","CATMOR2\r","SY(MORFAC04)","6","O","DISPLAYBASE","12410"
"MORFAC","CATMOR3\r","SY(PILPNT02)","6","O","OTHER","32440"
"MORFAC","CATMOR5\r","SY(PILPNT02)","6","O","DISPLAYBASE","12410"
"MORFAC","CATMOR7\r","SY(BOYMOR11)","8","O","DISPLAYBASE","17010"
"OBSTRN","","CS(OBSTRN04)","4","O","OTHER","34050"

```
"OBSTRN","CATOBS7\","SY(FOULGND1)","4","O","OTHER","34050"
"OBSTRN","CATOBS9\","SY(ACHARE02)","4","O","OTHER","34050"
"OFSPLF","","SY(OFSPLF01);TE('Prod %s','OBJNAM',3,1,2,'15110',1,-1,CHBLK,21)","5","O","DISPLAYBASE","12210"
"PILBOP","","SY(PILBOP02);TE('Plt %s','OBJNAM',3,1,2,'15110',1,-1,CHBLK,21)","6","O","STANDARD","28010"
"PILPNT","","SY(PILPNT02)","5","O","DISPLAYBASE","12410"
"PIPARE","","SY(CHINFO07)","4","O","STANDARD","26230"
"PIPSOL","","","","S","",""
"PRCARE","","SY(PRCARE12)","5","O","DISPLAYBASE","15010"
"PRDARE","","","","S","",""
"PRDARE","CATPRA5\CONVIS1\","SY(FLASTK11)","4","O","STANDARD","22220"
"PRDARE","CATPRA8\CONVIS1\","SY(TNKCON12)","4","O","STANDARD","22220"
"PRDARE","CATPRA9\CONVIS1\","SY(WIMCON11)","4","O","STANDARD","22220"
"PRDARE","CATPRA1\","SY(PRDINS02)","3","O","OTHER","32270"
"PRDARE","CATPRA5\","SY(FLASTK01)","3","O","OTHER","32270"
"PRDARE","CATPRA6\","SY(TMBYRD01)","3","O","OTHER","32270"
"PRDARE","CATPRA8\","SY(TNKCON02)","3","O","OTHER","32270"
"PRDARE","CATPRA9\","SY(WIMCON01)","3","O","OTHER","32270"
"PYLONS","","SY(POSGEN03)","8","O","DISPLAYBASE","12210"
"RADRFL","","SY(RADRFL03)","6","O","STANDARD","27230"
"RADSTA","","SY(POSGEN01)","5","O","OTHER","38010"
"RADSTA","CATRAS2\","SY(RDOSTA02);TE('ch %s','COMCHA',3,1,2,'15110',0,0,CHBLK,11)","5","O","OTHER","38010"
"RAPIDS","","","","S","",""
"RCTLPT","","SY(RTLDEF51)","4","O","DISPLAYBASE","15020"
"RCTLPT","ORIENT\","SY(RCTLPT52,ORIENT)","4","O","DISPLAYBASE","15020"
"RDOCAL","","SY(RCLDEF01);TE('No %s','OBJNAM',3,2,2,'15110',1,-1,CHBLK,21)","6","O","DISPLAYBASE","15060"
"RDOCAL","TRAFIC1\ORIENT\","SY(RDOCAL02,ORIENT);TE('No%s','OBJNAM',3,1,2,'15110',1,-1,CHBLK,21);TE('ch
%s','COMCHA',3,1,2,'15110',1,1,CHBLK,11)","6","O","DISPLAYBASE","15060"
"RDOCAL","TRAFIC2\ORIENT\","SY(RDOCAL02,ORIENT);TE('No%s','OBJNAM',3,1,2,'15110',1,-1,CHBLK,21);TE('ch
%s','COMCHA',3,1,2,'15110',1,1,CHBLK,11)","6","O","DISPLAYBASE","15060"
"RDOCAL","TRAFIC3\ORIENT\","SY(RDOCAL02,ORIENT);TE('No%s','OBJNAM',3,1,2,'15110',1,-1,CHBLK,21);TE('ch
%s','COMCHA',3,1,2,'15110',1,1,CHBLK,11)","6","O","DISPLAYBASE","15060"
"RDOCAL","TRAFIC4\ORIENT\","SY(RDOCAL03,ORIENT);TE('No%s','OBJNAM',3,1,2,'15110',1,-1,CHBLK,21);TE('ch
%s','COMCHA',3,1,2,'15110',1,1,CHBLK,11)","6","O","DISPLAYBASE","15060"
"RDOSTA","","SY(RDOSTA02)","4","O","OTHER","38010"
"RETRFL","","SY(RETRFL02)","6","O","STANDARD","27080"
"ROADWY","","","","S","",""
"RSCSTA","","SY(RSCSTA02)","7","O","OTHER","38030"
"RTPBCN","","SY(RTPBCN02)","6","O","STANDARD","27210"
"RUNWAY","","","","S","",""
"SBDARE","","TX(NATSUR,1,2,2,'15110',0,0,CHBLK,25)","4","O","OTHER","34010"
"SEAARE","","TX(OBJNAM,1,2,3,'15110',0,0,CHBLK,26)","3","S","STANDARD","21060"
"SILTNK","","SY(TNKCON02)","4","O","OTHER","32220"
"SILTNK","CATSIL1\CONVIS1\","SY(SILBUI11)","4","O","STANDARD","22220"
"SILTNK","CATSIL2\CONVIS1\","SY(TNKCON12)","4","O","STANDARD","22220"
"SILTNK","CATSIL3\CONVIS1\","SY(TOWERS03)","4","O","STANDARD","22220"
"SILTNK","CATSIL4\CONVIS1\","SY(TOWERS12)","4","O","STANDARD","22220"
"SILTNK","CONVIS1\","SY(TNKCON12)","4","O","STANDARD","22220"
"SILTNK","CATSIL1\","SY(SILBUI01)","4","O","OTHER","32220"
"SILTNK","CATSIL2\","SY(TNKCON02)","4","O","OTHER","32220"
"SILTNK","CATSIL3\","SY(TOWERS01)","4","O","OTHER","32220"
"SILTNK","CATSIL4\","SY(TOWERS02)","4","O","OTHER","32220"
"SISTAT","","SY(SISTAT02)","7","O","STANDARD","28020"
"SISTAW","","SY(SISTAT02)","7","O","STANDARD","28020"
"SLCONS","","SY(MORFAC03);CS(SLCONS03)","8","O","DISPLAYBASE","12410"
"SLOGRD","","SY(HILTOP01)","3","S","OTHER","32010"
"SLOTOP","","SY(HILTOP01)","3","S","OTHER","32010"
"SLOTOP","CONVIS1\","SY(HILTOP11)","3","S","STANDARD","22220"
"SMCFAC","","","","S","",""
"SNDWAV","","SY(SNDWAV02)","4","O","STANDARD","24010"
"SOUNDG","","CS(SOUNDG02)","6","O","OTHER","33010"
"SPLARE","","SY(CHINFO06)","4","O","STANDARD","26040"
"SPRING","","SY(SPRING02)","4","O","OTHER","34020"
"T_HMON","","SY(TIDEHT01)","4","O","OTHER","33050"
"T_NHMN","","SY(TIDEHT01)","4","O","OTHER","33050"
"T_TIMS","","SY(TIDEHT01)","4","O","OTHER","33050"
"TS_FEB","","SY(CURDEF01)","4","O","OTHER","33060"
"TS_FEB","CAT_TS1\ORIENT\","SY(FLDSTR01,ORIENT);TE('%4.1lf kn','CURVEL',3,1,2,'15110',1,-1,CHBLK,31)","4","O","OTHER","33060"
"TS_FEB","CAT_TS2\ORIENT\","SY(EBBSTR01,ORIENT);TE('%4.1lf kn','CURVEL',3,1,2,'15110',1,-1,CHBLK,31)","4","O","OTHER","33060"
"TS_FEB","CAT_TS3\ORIENT\","SY(CURENT01,ORIENT);TE('%4.1lf kn','CURVEL',3,1,2,'15110',1,-1,CHBLK,31)","4","O","OTHER","33060"
"TS_PAD","","SY(TIDSTR01)","4","O","OTHER","33060"
"TS_PNH","","SY(TIDSTR01)","4","O","OTHER","33060"
"TS_PRH","","SY(TIDSTR01)","4","O","OTHER","33060"
"TS_TIS","","SY(TIDSTR01)","4","O","OTHER","33060"
"TOPMAR","","","","S","",""
"TUNNEL","","","","S","",""
"UWTROC","","CS(OBSTRN04)","4","O","OTHER","34050"
"VEGATN","","","","S","",""
"WATFAL","","","","S","",""
"WATTUR","","SY(WATTUR02)","3","O","OTHER","33040"
"WEDKLP","","SY(WEDKLP03)","3","O","OTHER","34020"
"WRECKS","","CS(WRECKS02)","4","O","OTHER","34050"
"WRECKS","CATWRK3\","SY(FOULGND1)","4","O","OTHER","34050"
*
* ***                                ***
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* *** section two: NON-STANDARD CLASSES ***
* ***                              ***
*
*Note: category "DISPLAYBASE" should not be removed from the display.
*For non-standard classes, all category "MARINERS STANDARD" and "MARINERS OTHER"
*should be drawn when "STANDARD DISPLAY" is drawn, and therefore may be re-assigned
*to the category of choosen by the mariner.
*
"cursor","","SY(CURSRA01)","8","O","DISPLAYBASE","11010"
"cursor","cursty2>r","SY(CURSRB01)","8","O","MARINERS OTHER","61040"
"dnghlt","","SY(DNGHILIT)","8","O","MARINERS STANDARD","53010"
"events","","SY(EVENTS02);TX(OBJNAM,3,2,3,'15110',1,0,CHBLK,50)","8","O","MARINERS STANDARD","52410"
"marfea","","SY(CHINFO09);TX(OBJNAM,3,1,3,'15110',1,-1,CHBLK,50)","8","O","MARINERS STANDARD","53050"
"marnot","","SY(CHINFO09);TX(usrmrk,3,1,2,'15110',0,0,CHBLK,50)","8","O","MARINERS STANDARD","53040"
"marnot","catnot1>r","SY(CHINFO08);TX(usrmrk,3,1,2,'15110',0,0,CHBLK,50)","8","O","MARINERS STANDARD","53030"
"marnot","catnot2>r","SY(CHINFO09);TX(usrmrk,3,1,2,'15110',0,0,CHBLK,50)","8","O","MARINERS STANDARD","53040"
"mnufea","","SY(CHINFO10)","5","O","MARINERS STANDARD","55010"
"mnufea","catnot1>r","SY(CHINFO10)","5","O","MARINERS STANDARD","55010"
"mnufea","catnot2>r","SY(CHINFO11)","5","O","MARINERS STANDARD","55020"
"ownshp","","CS(OWNSHP02)","9","O","DISPLAYBASE","42010"
"plnpos","","SY(PLNPOS01);SY(PLNPOS02,ORIENT);TX(plndat,1,2,2,'15110',4,3,CHBLK,50);","5","O","MARINERS STANDARD","52030"
"positn","","SY(POSITN02);TX(loctim,1,1,2,'15110',0,-1,CHBLK,50)","5","O","MARINERS OTHER","62010"
"positn","pfmeth1>r","SY(POSITN02);TX('DR',2,3,2,'15110',-1,1,CHBLK,50);TX(loctim,1,1,2,'15110',0,-1,CHBLK,50)","5","O","MARINERS OTHER","62010"
"positn","pfmeth2>r","SY(POSITN02);TX('EP',2,3,2,'15110',-1,1,CHBLK,50);TX(loctim,1,1,2,'15110',0,-1,CHBLK,50)","5","O","MARINERS OTHER","62010"
"positn","pfmeth3>r","SY(POSITN02);TX('V',3,3,2,'15110',1,1,CHBLK,50);TX(loctim,1,1,2,'15110',0,-1,CHBLK,50)","5","O","MARINERS OTHER","62010"
"positn","pfmeth4>r","SY(POSITN02);TX('A',3,3,2,'15110',1,1,CHBLK,50);TX(loctim,1,1,2,'15110',0,-1,CHBLK,50)","5","O","MARINERS OTHER","62010"
"positn","pfmeth5>r","SY(POSITN02);TX('R',3,3,2,'15110',1,1,CHBLK,50);TX(loctim,1,1,2,'15110',0,-1,CHBLK,50)","5","O","MARINERS OTHER","62010"
"positn","pfmeth6>r","SY(POSITN02);TX('D',3,3,2,'15110',1,1,CHBLK,50);TX(loctim,1,1,2,'15110',0,-1,CHBLK,50)","5","O","MARINERS OTHER","62010"
"positn","pfmeth7>r","SY(POSITN02);TX('G',3,3,2,'15110',1,1,CHBLK,50);TX(loctim,1,1,2,'15110',0,-1,CHBLK,50)","5","O","MARINERS OTHER","62010"
"positn","pfmeth8>r","SY(POSITN02);TX('Gl',3,3,2,'15110',1,1,CHBLK,50);TX(loctim,1,1,2,'15110',0,-1,CHBLK,50)","5","O","MARINERS OTHER","62010"
"positn","pfmeth9>r","SY(POSITN02);TX('L',3,3,2,'15110',1,1,CHBLK,50);TX(loctim,1,1,2,'15110',0,-1,CHBLK,50)","5","O","MARINERS OTHER","62010"
"positn","pfmeth10>r","SY(POSITN02);TX('M',3,3,2,'15110',1,1,CHBLK,50);TX(loctim,1,1,2,'15110',0,-1,CHBLK,50)","5","O","MARINERS OTHER","62010"
"positn","pfmeth11>r","SY(POSITN02);TX('O',3,3,2,'15110',1,1,CHBLK,50);TX(loctim,1,1,2,'15110',0,-1,CHBLK,50)","5","O","MARINERS OTHER","62010"
"positn","pfmeth12>r","SY(POSITN02);TX('T',3,3,2,'15110',1,1,CHBLK,50);TX(loctim,1,1,2,'15110',0,-1,CHBLK,50)","5","O","MARINERS OTHER","62010"
"positn","pfmeth13>r","SY(POSITN02);TX('dG',3,3,2,'15110',1,1,CHBLK,50);TX(loctim,1,1,2,'15110',0,-1,CHBLK,50)","5","O","MARINERS OTHER","62010"

"positn","pfmeth14>r","SY(POSITN02);TX('dGl',3,3,2,'15110',1,1,CHBLK,50);TX(loctim,1,1,2,'15110',0,-1,CHBLK,50)","5","O","MARINERS OTHER","62010"
"positn","pfmeth15>r","SY(POSITN02);TX('dO',3,3,2,'15110',1,1,CHBLK,50);TX(loctim,1,1,2,'15110',0,-1,CHBLK,50)","5","O","MARINERS OTHER","62010"
"refpnt","","SY(REFPNT02)","7","O","MARINERS OTHER","61050"
"tidcur","","SY(TIDCUR01,ORIENT);SY(TIDCUR03);TX(curstr,2,3,2,'15110',-1,2,CHBLK,50);TX(loctim,3,1,2,'15110',1,-2,CHBLK,50)","7","O","MARINERS
STANDARD","53080"
"tidcur","catcur1>r","SY(TIDCUR01,ORIENT);SY(TIDCUR03);TX('P',2,3,2,'15110',-4,2,CHBLK,50);TX(curstr,2,3,2,'15110',-1,2,CHBLK,50);TX(loctim,3,1,2,'15110',1,-2
,CHBLK,50)","7","O","MARINERS STANDARD","53080"
"tidcur","catcur2>r","SY(TIDCUR02,ORIENT);SY(TIDCUR03);TX('A',2,3,2,'15110',-4,2,CHBLK,50);TX(curstr,2,3,2,'15110',-1,2,CHBLK,50);TX(loctim,3,1,2,'15110',1,-
2,CHBLK,50)","7","O","MARINERS STANDARD","53080"
"vessel","","CS(VESSEL01)","9","O","MARINERS STANDARD","54030"
"waypnt","","SY(WAYPNT11);TX(OBJNAM,3,1,3,'15110',1,-1,APLRT,50)","8","O","DISPLAYBASE","42210"
"waypnt","select1>r","SY(WAYPNT11);TX(OBJNAM,3,1,3,'15110',1,-1,CHBLK,50)","8","O","DISPLAYBASE","42210"
"waypnt","select2>r","SY(WAYPNT03);TX(OBJNAM,3,1,3,'15110',1,-1,APLRT,50)","8","O","MARINERS STANDARD","52210"
*
* ***                  ***
* *** end of look-up table ***
* ***                  ***
```

## 11.2 Look-up Table Listing for Object Type Line 'L'

```
* *** LINES                                ***
* *** This is the look-up table for line symbolization.  ***
* *** For edition 3.2 Preslib, dated March  2000         ***
*
* Each line contains minimum 6 fields:
*  1. field - code of the object class
*  2. field - attribute combination
*  3. field - symbolization instruction
*  4. field - display priority
*  5. field - radar
*  6. field - IMO display category
*  7. field - viewing group (optional)
*
* Each field entry is framed by "'" and fields are separated by ','.
*
* Please note, that the entries to this table must be in
* alphabetic order (sorted by the class code).
*
* This table has 2 sections:
```

```
*
* - The first section contains symbolization instructions for
*   standard S-57 'real world' objects:
* - The second section contains symbolization instructions for
*   non-standard (class code in lowercase) objects:
*
* default for symbolization failure; must be the first entry to look-up table
"######","","LC(QUESMRK1)","5","O","STANDARD","21010"
*
* ***                         ***
* *** section one: REAL WORLD CLASSES ***
* ***                         ***
*
"BERTHS","","LS(SOLD,3,CHGRD);SY(BRTHNO01);TE('No %s','OBJNAM',1,2,2,'15110',0,0,CHBLK,29)","5","O","OTHER","32440"
"BRIDGE","","LS(SOLD,5,CHGRD);TX(OBJNAM,3,1,2,'15110',1,0,CHBLK,21);TE('clr
%4.1lf','VERCLR',3,1,2,'15110',1,1,CHBLK,11)","8","O","DISPLAYBASE","12210"
"BRIDGE","CATBRG2`r","LS(SOLD,5,CHGRD);SY(BRIDGE01);TE('clrcl%4.1lf','VERCCL',3,1,2,'15110',1,0,CHBLK,11);TE('clrop
%4.1lf','VERCOP',3,1,2,'15110',1,1,CHBLK,11)","8","O","DISPLAYBASE","12210"
"BRIDGE","CATBRG3`r","LS(SOLD,5,CHGRD);SY(BRIDGE01);TE('clrcl%4.1lf','VERCCL',3,1,2,'15110',1,0,CHBLK,11);TE('clrop
%4.1lf','VERCOP',3,1,2,'15110',1,1,CHBLK,11)","8","O","DISPLAYBASE","12210"
"BRIDGE","CATBRG4`r","LS(SOLD,5,CHGRD);SY(BRIDGE01);TE('clrcl%4.1lf','VERCCL',3,1,2,'15110',1,0,CHBLK,11);TE('clrop
%4.1lf','VERCOP',3,1,2,'15110',1,1,CHBLK,11)","8","O","DISPLAYBASE","12210"
"BRIDGE","CATBRG5`r","LS(SOLD,5,CHGRD);SY(BRIDGE01);TE('clrcl%4.1lf','VERCCL',3,1,2,'15110',1,0,CHBLK,11);TE('clrop
%4.1lf','VERCOP',3,1,2,'15110',1,1,CHBLK,11)","8","O","DISPLAYBASE","12210"
"BRIDGE","CATBRG7`r","LS(SOLD,5,CHGRD);SY(BRIDGE01);TE('clrcl%4.1lf','VERCCL',3,1,2,'15110',1,0,CHBLK,11);TE('clrop
%4.1lf','VERCOP',3,1,2,'15110',1,1,CHBLK,11)","8","O","DISPLAYBASE","12210"
"BRIDGE","CATBRG8`r","LS(SOLD,5,CHGRD);SY(BRIDGE01);TE('clrcl%4.1lf','VERCCL',3,1,2,'15110',1,0,CHBLK,11);TE('clrop
%4.1lf','VERCOP',3,1,2,'15110',1,1,CHBLK,11)","8","O","DISPLAYBASE","12210"
"CANALS","","LS(SOLD,1,CHBLK)","2","O","DISPLAYBASE","12420"
"CAUSWY","","LS(SOLD,3,LANDF)","5","O","STANDARD","22010"
"CAUSWY","WATLEV4`r","LS(DASH,3,LANDF)","5","O","STANDARD","22010"
"CBLOHD","","LS(DASH,4,CHGRD)","8","O","DISPLAYBASE","12210"
"CBLOHD","CONRAD1`rVERCSA`r","LS(DASH,4,CHGRD);SY(RACNSP01);TE('sfclr
%4.1lf','VERCSA',3,1,2,'15110',1,0,CHBLK,11)","8","O","DISPLAYBASE","12210"
"CBLOHD","CONRAD3`rVERCSA`r","LS(DASH,4,CHGRD);SY(RACNSP01);TE('sfclr
%4.1lf','VERCSA',3,1,2,'15110',1,0,CHBLK,11)","8","O","DISPLAYBASE","12210"
"CBLOHD","CONRAD1`rVERCLR`r","LS(DASH,4,CHGRD);SY(RACNSP01);TE('clr
%4.1lf','VERCLR',3,1,2,'15110',1,0,CHBLK,11)","8","O","DISPLAYBASE","12210"
"CBLOHD","CONRAD3`rVERCLR`r","LS(DASH,4,CHGRD);SY(RACNSP01);TE('clr
%4.1lf','VERCLR',3,1,2,'15110',1,0,CHBLK,11)","8","O","DISPLAYBASE","12210"
"CBLOHD","CONRAD1`r","LS(DASH,4,CHGRD);SY(RACNSP01)","8","O","DISPLAYBASE","12210"
"CBLOHD","CONRAD3`r","LS(DASH,4,CHGRD);SY(RACNSP01)","8","O","DISPLAYBASE","12210"
"CBLOHD","VERCSA`r","LS(DASH,4,CHGRD);TE('sf clr %4.1lf','VERCSA',3,1,2,'15110',1,0,CHBLK,11)","8","O","DISPLAYBASE","12210"
"CBLOHD","VERCLR`r","LS(DASH,4,CHGRD);TE('sf clr %4.1lf','VERCLR',3,1,2,'15110',1,0,CHBLK,11)","8","O","DISPLAYBASE","12210"
"CBLSUB","","LC(CBLSUB06)","3","O","OTHER","34070"
"CBLSUB","CATCBL6`r","LS(DASH,1,CHMGD)","6","O","STANDARD","24010"
"COALNE","","CS(QUAPOS01)","7","O","DISPLAYBASE","12410"
"COALNE","CATCOA6`r","LS(DASH,1,CSTLN)","7","O","DISPLAYBASE","12410"
"COALNE","CATCOA7`r","LS(DASH,1,CSTLN)","7","O","DISPLAYBASE","12410"
"COALNE","CATCOA8`r","LS(DASH,1,CSTLN)","7","O","DISPLAYBASE","12410"
"COALNE","CATCOA10`r","LS(DASH,1,CSTLN)","7","O","DISPLAYBASE","12410"
"CONVYR","","LS(DASH,4,CHGRD);TE('clr %4.1lf','VERCLR',3,1,2,'15110',1,0,CHBLK,11)","8","O","DISPLAYBASE","12210"
"CONVYR","CATCON1`rCONRAD1`r","LS(DASH,4,CHGRD);SY(RACNSP01);TE('clr
%4.1lf','VERCLR',3,1,2,'15110',1,0,CHBLK,11)","8","O","DISPLAYBASE","12210"
"CONVYR","CATCON1`rCONRAD3`r","LS(DASH,4,CHGRD);SY(RACNSP01);TE('clr
%4.1lf','VERCLR',3,1,2,'15110',1,0,CHBLK,11)","8","O","DISPLAYBASE","12210"
"CONVYR","CATCON2`rCONRAD1`r","LS(SOLD,3,CHGRD);SY(RACNSP01);TE('clr
%4.1lf','VERCLR',3,1,2,'15110',1,0,CHBLK,11)","8","O","DISPLAYBASE","12210"
"CONVYR","CATCON2`rCONRAD3`r","LS(SOLD,3,CHGRD);SY(RACNSP01);TE('clr
%4.1lf','VERCLR',3,1,2,'15110',1,0,CHBLK,11)","8","O","DISPLAYBASE","12210"
"CONVYR","CATCON1`r","LS(DASH,4,CHGRD);TE('clr %4.1lf','VERCLR',3,1,2,'15110',1,0,CHBLK,11)","8","O","DISPLAYBASE","12210"
"CONVYR","CATCON2`r","LS(SOLD,3,CHGRD);TE('clr %4.1lf','VERCLR',3,1,2,'15110',1,0,CHBLK,11)","8","O","DISPLAYBASE","12210"
"CONVYR","CONRAD1`r","LS(DASH,4,CHGRD);SY(RACNSP01);TE('clr %4.1lf','VERCLR',3,1,2,'15110',1,0,CHBLK,11)","8","O","DISPLAYBASE","12210"
"CONVYR","CONRAD3`r","LS(DASH,4,CHGRD);SY(RACNSP01);TE('clr %4.1lf','VERCLR',3,1,2,'15110',1,0,CHBLK,11)","8","O","DISPLAYBASE","12210"
"DAMCON","","LS(SOLD,4,LANDF)","6","O","STANDARD","22010"
"DAMCON","CATDAM3`r","LS(SOLD,2,CSTLN)","6","O","DISPLAYBASE","12410"
"DEPARE","","CS(DEPCNT02)","3","O","OTHER","33020"
"DEPCNT","","CS(DEPCNT02)","5","O","OTHER","33020"
"DWRTCL","","LC(DWLDEF01);TE('%03.0lf deg','ORIENT',3,1,2,'15110',1,-1,CHBLK,11)","6","O","DISPLAYBASE","15010"
"DWRTCL","CATTRK1`rTRAFIC1`r","LC(DWRTCL08);TE('%03.0lf deg','ORIENT',3,1,2,'15110',1,-1,CHBLK,11)","6","O","DISPLAYBASE","15010"
"DWRTCL","CATTRK1`rTRAFIC2`r","LC(DWRTCL08);TE('%03.0lf deg','ORIENT',3,1,2,'15110',1,-1,CHBLK,11)","6","O","DISPLAYBASE","15010"
"DWRTCL","CATTRK1`rTRAFIC3`r","LC(DWRTCL08);TE('%03.0lf deg','ORIENT',3,1,2,'15110',1,-1,CHBLK,11)","6","O","DISPLAYBASE","15010"
"DWRTCL","CATTRK1`rTRAFIC4`r","LC(DWRTCL06);TE('%03.0lf deg','ORIENT',3,1,2,'15110',1,-1,CHBLK,11)","6","O","DISPLAYBASE","15010"
"DWRTCL","CATTRK2`rTRAFIC1`r","LC(DWRTCL07);TE('%03.0lf deg','ORIENT',3,1,2,'15110',1,-1,CHBLK,11)","6","O","DISPLAYBASE","15010"
"DWRTCL","CATTRK2`rTRAFIC2`r","LC(DWRTCL07);TE('%03.0lf deg','ORIENT',3,1,2,'15110',1,-1,CHBLK,11)","6","O","DISPLAYBASE","15010"
"DWRTCL","CATTRK2`rTRAFIC3`r","LC(DWRTCL07);TE('%03.0lf deg','ORIENT',3,1,2,'15110',1,-1,CHBLK,11)","6","O","DISPLAYBASE","15010"
"DWRTCL","CATTRK2`rTRAFIC4`r","LC(DWRTCL05);TE('%03.0lf deg','ORIENT',3,1,2,'15110',1,-1,CHBLK,11)","6","O","DISPLAYBASE","15010"
"DWRTCL","TRAFIC1`r","LC(DWRTCL07);TE('%03.0lf deg','ORIENT',3,1,2,'15110',1,-1,CHBLK,11)","6","O","DISPLAYBASE","15010"
"DWRTCL","TRAFIC2`r","LC(DWRTCL07);TE('%03.0lf deg','ORIENT',3,1,2,'15110',1,-1,CHBLK,11)","6","O","DISPLAYBASE","15010"
"DWRTCL","TRAFIC3`r","LC(DWRTCL07);TE('%03.0lf deg','ORIENT',3,1,2,'15110',1,-1,CHBLK,11)","6","O","DISPLAYBASE","15010"
"DWRTCL","TRAFIC4`r","LC(DWRTCL05);TE('%03.0lf deg','ORIENT',3,1,2,'15110',1,-1,CHBLK,11)","6","O","DISPLAYBASE","15010"
"DYKCON","","LS(SOLD,3,LANDF)","4","O","STANDARD","22010"
"DYKCON","CONRAD1`r","LS(SOLD,2,CHBLK)","4","O","STANDARD","22210"
"FERYRT","","LC(FERYRT02)","4","O","STANDARD","25030"
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"FERYRT","CATFRY1`r","LC(FERYRT01)","4","O","STANDARD","25030"
"FERYRT","CATFRY2`r","LC(FERYRT02)","4","O","STANDARD","25030"
"FLODOC","","LS(SOLD,3,CSTLN)","5","O","DISPLAYBASE","12410"
"FNCLNE","","LS(SOLD,1,LANDF)","3","O","OTHER","32220"
"FNCLNE","CONVIS1`r","LS(SOLD,1,CHBLK)","3","O","STANDARD","22220"
"FORSTC","","LS(SOLD,3,LANDF)","4","O","OTHER","32220"
"FSHFAC","","LS(DASH,2,CHGRD)","4","O","OTHER","34040"
"FSHFAC","CATFIF1`r","LC(FSHFAC02)","4","O","OTHER","34040"
"GATCON","","LS(SOLD,2,CSTLN)","8","O","DISPLAYBASE","12410"
"GATCON","CATGAT2`r","LS(SOLD,2,CSTLN)","8","O","DISPLAYBASE","12410"
"GATCON","CATGAT3`r","LS(SOLD,2,CSTLN);SY(GATCON04)","8","O","DISPLAYBASE","12410"
"GATCON","CATGAT4`r","LS(SOLD,2,CSTLN);SY(GATCON03)","8","O","DISPLAYBASE","12410"
"GATCON","CATGAT5`r","LS(SOLD,2,CSTLN)","8","O","DISPLAYBASE","12410"
"LNDARE","","CS(QUAPOS01)","8","O","DISPLAYBASE","12010"
"LNDELV","","LS(SOLD,1,LANDF)","4","O","OTHER","32010"
"LNDMRK","","LS(SOLD,1,LANDF)","4","O","OTHER","32220"
"LNDMRK","CONVIS1`r","LS(SOLD,1,CHBLK)","4","O","STANDARD","22220"
"LOCMAG","","LS(DASH,1,CHMGF);SY(LOCMAG01)","4","S","OTHER","31080"
"M_SREL","","","","S","",""
"MAGVAR","","LS(SOLD,2,CHMGF);SY(MAGVAR51);TE('varn %s','VALMAG',3,1,2,'15110',1,-1,CHBLK,27)","4","O","OTHER","31080"
"MARCUL","","LS(DASH,2,CHGRF)","4","O","STANDARD","26210"
"MORFAC","","LS(SOLD,2,CSTLN)","6","O","OTHER","32440"
"MORFAC","CATMOR4`r","LS(SOLD,2,CSTLN)","6","O","DISPLAYBASE","12410"
"MORFAC","CATMOR6`r","LS(DASH,1,CHMGF)","6","O","DISPLAYBASE","14010"
"NAVLNE","","LS(DASH,1,CHGRD);TE('%03.0lf deg','ORIENT',3,1,2,'15110',1,-1,CHBLK,11)","4","O","STANDARD","25010"
"OBSTRN","","CS(OBSTRN04)","4","O","OTHER","34050"
"OBSTRN","CATOBS8`r","LS(DASH,1,CSTLN)","4","O","DISPLAYBASE","12410"
"OILBAR","","LS(DASH,1,CHBLK)","4","O","DISPLAYBASE","12410"
"PIPOHD","","LS(SOLD,3,CHGRD);TE('clr %4.1lf','VERCLR',3,1,2,'15110',1,-1,CHBLK,11)","8","O","DISPLAYBASE","12210"
"PIPOHD","CONRAD1`r","LS(SOLD,3,CHGRD);SY(RACNSP01);TE('clr %4.1lf','VERCLR',3,1,2,'15110',1,-1,CHBLK,11)","8","O","DISPLAYBASE","12210"
"PIPOHD","CONRAD3`r","LS(SOLD,3,CHGRD);SY(RACNSP01);TE('clr %4.1lf','VERCLR',3,1,2,'15110',1,-1,CHBLK,11)","8","O","DISPLAYBASE","12210"
"PIPSOL","","LC(PIPSOL05)","6","O","OTHER","34070"

"PIPSOL","PRODCT3`r","LC(PIPSOL06)","6","O","OTHER","34070"
"PIPSOL","CATPIP2`r","LC(PIPSOL06)","6","O","OTHER","34070"
"PIPSOL","CATPIP3`r","LC(PIPSOL06)","6","O","OTHER","34070"
"PIPSOL","CATPIP4`r","LC(PIPSOL06)","6","O","OTHER","34070"
"PIPSOL","CATPIP5`r","LC(PIPSOL06)","6","O","OTHER","34070"
"PONTON","","LS(SOLD,2,CSTLN)","5","O","DISPLAYBASE","12410"
"RADLNE","","LS(DASH,2,TRFCD);TE('%03.0lf deg','ORIENT',3,1,2,'15110',1,-1,CHBLK,11)","6","O","STANDARD","25040"
"RAILWY","","LS(SOLD,2,LANDF)","4","O","OTHER","32250"
"RAPIDS","","LS(SOLD,3,CHGRD)","3","O","OTHER","32050"
"RCRTCL","","LC(RCRDEF11);TE('%03.0lf deg','ORIENT',3,1,2,'15110',1,-1,CHBLK,11)","6","O","DISPLAYBASE","15020"
"RCRTCL","CATTRK1`rTRAFIC1`r","LC(RCRTCL14);TE('%03.0lf deg','ORIENT',3,1,2,'15110',1,-1,CHBLK,11)","6","O","DISPLAYBASE","15020"
"RCRTCL","CATTRK1`rTRAFIC2`r","LC(RCRTCL14);TE('%03.0lf deg','ORIENT',3,1,2,'15110',1,-1,CHBLK,11)","6","O","DISPLAYBASE","15020"
"RCRTCL","CATTRK1`rTRAFIC3`r","LC(RCRTCL14);TE('%03.0lf deg','ORIENT',3,1,2,'15110',1,-1,CHBLK,11)","6","O","DISPLAYBASE","15020"
"RCRTCL","CATTRK1`rTRAFIC4`r","LC(RCRTCL13);TE('%03.0lf deg','ORIENT',3,1,2,'15110',1,-1,CHBLK,11)","6","O","DISPLAYBASE","15020"
"RCRTCL","CATTRK2`rTRAFIC1`r","LC(RCRTCL12);TE('%03.0lf deg','ORIENT',3,1,2,'15110',1,-1,CHBLK,11)","6","O","DISPLAYBASE","15020"
"RCRTCL","CATTRK2`rTRAFIC2`r","LC(RCRTCL12);TE('%03.0lf deg','ORIENT',3,1,2,'15110',1,-1,CHBLK,11)","6","O","DISPLAYBASE","15020"
"RCRTCL","CATTRK2`rTRAFIC3`r","LC(RCRTCL12);TE('%03.0lf deg','ORIENT',3,1,2,'15110',1,-1,CHBLK,11)","6","O","DISPLAYBASE","15020"
"RCRTCL","CATTRK2`rTRAFIC4`r","LC(RCRTCL11);TE('%03.0lf deg','ORIENT',3,1,2,'15110',1,-1,CHBLK,11)","6","O","DISPLAYBASE","15020"
"RCRTCL","TRAFIC1`r","LC(RCRTCL12);TE('%03.0lf deg','ORIENT',3,1,2,'15110',1,-1,CHBLK,11)","6","O","DISPLAYBASE","15020"
"RCRTCL","TRAFIC2`r","LC(RCRTCL12);TE('%03.0lf deg','ORIENT',3,1,2,'15110',1,-1,CHBLK,11)","6","O","DISPLAYBASE","15020"
"RCRTCL","TRAFIC3`r","LC(RCRTCL12);TE('%03.0lf deg','ORIENT',3,1,2,'15110',1,-1,CHBLK,11)","6","O","DISPLAYBASE","15020"
"RCRTCL","TRAFIC4`r","LC(RCRTCL11);TE('%03.0lf deg','ORIENT',3,1,2,'15110',1,-1,CHBLK,11)","6","O","DISPLAYBASE","15020"
"RDOCAL","","LS(DASH,1,TRFCD);SY(RCLDEF01);TE('No %s','OBJNAM',3,2,2,'15110',1,-1,CHBLK,21)","6","O","DISPLAYBASE","15060"
"RDOCAL","TRAFIC1`rORIENT`r","LS(DASH,1,TRFCD);SY(RDOCAL02,ORIENT);TE('No%s','OBJNAM',3,1,2,'15110',1,-1,CHBLK,21);TE('ch
%s','COMCHA',3,1,2,'15110',1,1,CHBLK,11)","6","O","DISPLAYBASE","15060"
"RDOCAL","TRAFIC2`rORIENT`r","LS(DASH,1,TRFCD);SY(RDOCAL02,ORIENT);TE('No%s','OBJNAM',3,1,2,'15110',1,-1,CHBLK,21);TE('ch
%s','COMCHA',3,1,2,'15110',1,1,CHBLK,11)","6","O","DISPLAYBASE","15060"
"RDOCAL","TRAFIC3`rORIENT`r","LS(DASH,1,TRFCD);SY(RDOCAL02,ORIENT);TE('No%s','OBJNAM',3,1,2,'15110',1,-1,CHBLK,21);TE('ch
%s','COMCHA',3,1,2,'15110',1,1,CHBLK,11)","6","O","DISPLAYBASE","15060"
"RDOCAL","TRAFIC4`rORIENT`r","LS(DASH,1,TRFCD);SY(RDOCAL03,ORIENT);TE('No%s','OBJNAM',3,1,2,'15110',1,-1,CHBLK,21);TE('ch
%s','COMCHA',3,1,2,'15110',1,1,CHBLK,11)","6","O","DISPLAYBASE","15060"
"RECTRC","","LC(RECDEF02);TE('%03.0lf deg','ORIENT',3,1,2,'15110',1,-1,CHBLK,11)","6","O","STANDARD","25020"
"RECTRC","CATTRK1`rTRAFIC1`r","LC(RECTRC12);TE('%03.0lf deg','ORIENT',3,1,2,'15110',1,-1,CHBLK,11)","6","O","STANDARD","25020"
"RECTRC","CATTRK1`rTRAFIC2`r","LC(RECTRC12);TE('%03.0lf deg','ORIENT',3,1,2,'15110',1,-1,CHBLK,11)","6","O","STANDARD","25020"
"RECTRC","CATTRK1`rTRAFIC3`r","LC(RECTRC12);TE('%03.0lf deg','ORIENT',3,1,2,'15110',1,-1,CHBLK,11)","6","O","STANDARD","25020"
"RECTRC","CATTRK1`rTRAFIC4`r","LC(RECTRC10);TE('%03.0lf deg','ORIENT',3,1,2,'15110',1,-1,CHBLK,11)","6","O","STANDARD","25020"
"RECTRC","CATTRK2`rTRAFIC1`r","LC(RECTRC11);TE('%03.0lf deg','ORIENT',3,1,2,'15110',1,-1,CHBLK,11)","6","O","STANDARD","25020"
"RECTRC","CATTRK2`rTRAFIC2`r","LC(RECTRC11);TE('%03.0lf deg','ORIENT',3,1,2,'15110',1,-1,CHBLK,11)","6","O","STANDARD","25020"
"RECTRC","CATTRK2`rTRAFIC3`r","LC(RECTRC11);TE('%03.0lf deg','ORIENT',3,1,2,'15110',1,-1,CHBLK,11)","6","O","STANDARD","25020"
"RECTRC","CATTRK2`rTRAFIC4`r","LC(RECTRC09);TE('%03.0lf deg','ORIENT',3,1,2,'15110',1,-1,CHBLK,11)","6","O","STANDARD","25020"
"RECTRC","TRAFIC1`r","LC(RECTRC11);TE('%03.0lf deg','ORIENT',3,1,2,'15110',1,-1,CHBLK,11)","6","O","STANDARD","25020"
"RECTRC","TRAFIC2`r","LC(RECTRC11);TE('%03.0lf deg','ORIENT',3,1,2,'15110',1,-1,CHBLK,11)","6","O","STANDARD","25020"
"RECTRC","TRAFIC3`r","LC(RECTRC11);TE('%03.0lf deg','ORIENT',3,1,2,'15110',1,-1,CHBLK,11)","6","O","STANDARD","25020"
"RECTRC","TRAFIC4`r","LC(RECTRC09);TE('%03.0lf deg','ORIENT',3,1,2,'15110',1,-1,CHBLK,11)","6","O","STANDARD","25020"
"RIVERS","","LS(SOLD,1,CHBLK)","2","O","OTHER","32050"
"ROADWY","","LS(SOLD,2,LANDF)","4","O","OTHER","32250"
"RUNWAY","","LS(SOLD,3,LANDF)","6","O","OTHER","32240"
"SBDARE","","LS(SOLD,1,CHGRD);TX(NATSUR,1,2,2,'15110',0,0,CHBLK,25)","4","O","OTHER","34010"
"SLCONS","","CS(SLCONS03)","7","O","DISPLAYBASE","12410"
"SLOTOP","","LS(SOLD,1,LANDF)","4","O","OTHER","32010"
"SLOTOP","CATSLO2`rCONRAD1`r","LS(SOLD,1,CHBLK)","4","O","STANDARD","22210"
"SLOTOP","CATSLO6`rCONRAD1`r","LS(SOLD,1,CHBLK)","4","O","STANDARD","22210"

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"SLOTOP","CATSLO6`CONVIS1`","LS(SOLD,1,CHBLK)","4","O","STANDARD","22210"
"SLOTOP","CATSLO2`","LS(SOLD,1,CHGRD)","4","O","OTHER","32010"
"SLOTOP","CATSLO6`","LS(SOLD,1,CHGRD)","4","O","OTHER","32010"
"SNDWAV","","LS(DASH,2,CHGRD);SY(SNDWAV02)","4","O","STANDARD","24010"
"STSLNE","","LS(DASH,1,CHGRF)","3","O","OTHER","36050"
"TIDEWY","","LS(SOLD,1,CHGRF)","3","O","OTHER","32070"
"TSELNE","","LS(SOLD,6,TRFCF)","8","O","DISPLAYBASE","15010"
"TSSBND","","LS(DASH,4,TRFCD)","7","O","DISPLAYBASE","15010"
"TUNNEL","","LS(DASH,1,CHGRD)","4","O","OTHER","32250"
"TUNNEL","BURDEP0`","LS(DASH,2,CHBLK)","4","O","STANDARD","24010"
"VEGATN","","LS(DASH,1,LANDF)","3","O","OTHER","32030"
"WATFAL","","LS(SOLD,3,CHGRF)","3","O","OTHER","32050"
"WATFAL","CONVIS1`","LS(SOLD,3,CHWHT)","3","O","OTHER","32050"
"WATTUR","","LS(DASH,1,CHGRD);SY(WATTUR02)","4","O","OTHER","33040"
*
* ***                              ***
* *** section two: NON-STANDARD CLASSES ***
* ***                              ***
*
*Note: category "DISPLAYBASE" should not be removed from the display.
*For non-standard classes, all category "MARINERS STANDARD" and "MARINERS OTHER"
*should be drawn when "STANDARD DISPLAY" is drawn, and therefore may be re-assigned
*to the category of choosen by the mariner.
*
"clrlin","","CS(CLRLIN01)","9","O","MARINERS OTHER","53020"
"dnghlt","","LS(SOLD,3,DNGHL)","8","O","MARINERS STANDARD","53010"
"ebline","","CS(VRMEBL01)","9","O","MARINERS OTHER","61010"
"leglin","","CS(LEGLIN02)","8","O","DISPLAYBASE","42210"
"marfea","","LS(SOLD,2,NINFO);TX(OBJNAM,3,3,2,'15110',0,1,CHBLK,50)","8","O","MARINERS OTHER","53050"
"mnufea","","LS(SOLD,1,ADINF)","5","O","MARINERS OTHER","55010"
"pastrk","","CS(PASTRK01)","3","O","MARINERS STANDARD","52430"
"poslin","","LS(SOLD,1,NINFO);TX(loctim,3,1,2,'15110',0,-1,CHBLK,50)","3","O","MARINERS OTHER","62020"
"poslin","transf2`","LS(SOLD,1,NINFO);TX(loctim,3,1,2,'15110',0,-1,CHBLK,50);TX('TPL',3,3,2,'15110',0,1,CHBLK,50)","3","O","MARINERS OTHER","62020"
"rngrng","","LS(SOLD,1,CURSR)","9","O","MARINERS OTHER","61030"
"vrmark","","CS(VRMEBL01)","9","O","MARINERS OTHER","61010"
"wholin","","LS(SOLD,2,NINFO);TX(loctim,3,3,2,'15110',0,1,CHBLK,50);TX(usrmrk,3,1,2,'15110',0,-1,CHBLK,50)","8","O","MARINERS STANDARD","52010"
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* ***                    ***
* *** end of look-up table ***
* ***                    ***
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## 11.3 Look-up Table Listing for Object Type Area 'A'

### 11.3.1 Look-up table for areas with symbolized boundaries

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* *** AREAS WITH SYMBOLIZED BOUNDARIES                ***
* *** This is the look-up table for area symbolization.  ***
* *** For edition 3.2 Preslib, dated March  2000       ***
*
* Each line contains minimum 6 fields:
*  1. field - code of the object class
*  2. field - attribute combination
*  3. field - symbolization instruction
*  4. field - display priority
*  5. field - radar
*  6. field - IMO display category
*  7. field - viewing group (optional)
*
* Each field entry is framed by "'" and fields are separated by ',.
*
* Please note, that the entries to this table must be in
* alphabetic order (sorted by the class code).
*
* This table has 2 sections:
*
* - The first section contains symbolization instructions for
*   standard S-57 'real world' objects:
* - The second section contains symbolization instructions for
*   non-standard (class code in lowercase) objects:
*
* default for symbolization failure; must be the first entry to look-up table
"######","","AP(QUESMRK1);LS(DASH,1,CHMGD)","5","S","STANDARD","21010"
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*
* ***                           ***
* *** section one: REAL WORLD CLASSES ***
* ***                           ***
*
"ACHARE","","SY(ACHARE51);LC(ACHARE51);CS(RESTRN01)","3","S","STANDARD","26220"
"ACHARE","CATACH8`r","SY(ACHARE02);LS(DASH,2,CHMGF);CS(RESTRN01)","3","S","STANDARD","26220"
"ACHBRT","","SY(ACHBRT07);TE('No %s','OBJNAM',3,1,2,'15110',1,0,CHBLK,29);LS(DASH,2,CHMGF)","5","S","STANDARD","26220"
"ADMARE","","LS(DASH,2,CHGRF)","2","S","OTHER","36050"
"AIRARE","","AP(AIRARE02);LS(SOLD,1,LANDF)","2","S","OTHER","32240"
"AIRARE","CONVIS1`r","AC(LANDA);AP(AIRARE02);LS(SOLD,1,CHBLK)","2","S","STANDARD","22220"
"BERTHS","","SY(BRTHNO01);TE('No %s','OBJNAM',3,1,2,'15110',1,0,CHBLK,29)","3","S","OTHER","32440"
"BRIDGE","","TX(OBJNAM,3,1,2,'15110',1,0,CHBLK,21);TE('clr
%4.1lf','VERCLR',3,1,2,'15110',1,1,CHBLK,11);LS(SOLD,4,CHGRD)","8","O","DISPLAYBASE","12210"
"BRIDGE","CATBRG2`r","SY(BRIDGE01);TE('clrcl%4.1lf','VERCCL',3,1,2,'15110',1,0,CHBLK,11);TE('clrop
%4.1lf','VERCOP',3,1,2,'15110',1,1,CHBLK,11);LS(SOLD,4,CHGRD)","8","O","DISPLAYBASE","12210"
"BRIDGE","CATBRG3`r","SY(BRIDGE01);TE('clrcl%4.1lf','VERCCL',3,1,2,'15110',1,0,CHBLK,11);TE('clrop
%4.1lf','VERCOP',3,1,2,'15110',1,1,CHBLK,11);LS(SOLD,4,CHGRD)","8","O","DISPLAYBASE","12210"
"BRIDGE","CATBRG4`r","SY(BRIDGE01);TE('clrcl%4.1lf','VERCCL',3,1,2,'15110',1,0,CHBLK,11);TE('clrop
%4.1lf','VERCOP',3,1,2,'15110',1,1,CHBLK,11);LS(SOLD,4,CHGRD)","8","O","DISPLAYBASE","12210"
"BRIDGE","CATBRG5`r","SY(BRIDGE01);TE('clrcl%4.1lf','VERCCL',3,1,2,'15110',1,0,CHBLK,11);TE('clrop
%4.1lf','VERCOP',3,1,2,'15110',1,1,CHBLK,11);LS(SOLD,4,CHGRD)","8","O","DISPLAYBASE","12210"
"BRIDGE","CATBRG7`r","SY(BRIDGE01);TE('clrcl%4.1lf','VERCCL',3,1,2,'15110',1,0,CHBLK,11);TE('clrop
%4.1lf','VERCOP',3,1,2,'15110',1,1,CHBLK,11);LS(SOLD,4,CHGRD)","8","O","DISPLAYBASE","12210"
"BRIDGE","CATBRG8`r","SY(BRIDGE01);TE('clrcl%4.1lf','VERCCL',3,1,2,'15110',1,0,CHBLK,11);TE('clrop
%4.1lf','VERCOP',3,1,2,'15110',1,1,CHBLK,11);LS(SOLD,4,CHGRD)","8","O","DISPLAYBASE","12210"

"BUAARE","","AC(CHBRN);TX(OBJNAM,1,2,3,'15110',0,0,CHBLK,26);LS(SOLD,1,LANDF)","3","S","STANDARD","22240"
"BUISGL","","AC(CHBRN);LS(SOLD,1,LANDF)","4","S","OTHER","32220"
"BUISGL","FUNCTN33`rCONVIS1`r","AC(CHBRN);TX(OBJNAM,1,2,2,'15110',0,0,CHBLK,26);LS(SOLD,1,CHBLK)","4","S","STANDARD","22220"
"BUISGL","FUNCTN33`r","AC(CHBRN);TX(OBJNAM,1,2,2,'15110',0,0,CHBLK,26);LS(SOLD,1,LANDF)","4","S","OTHER","32220"
"BUISGL","CONVIS1`r","AC(CHBRN);LS(SOLD,1,CHBLK)","4","S","STANDARD","22220"
"CANALS","","AC(DEPVS);LS(SOLD,1,CHBLK)","2","S","DISPLAYBASE","12420"
"CANALS","CONDTN`r","AC(DEPVS);LS(DASH,1,CHBLK)","2","S","DISPLAYBASE","12420"
"CAUSWY","","AC(CHBRN);LS(SOLD,1,CSTLN)","5","S","STANDARD","22010"
"CAUSWY","WATLEV4`r","AC(DEPIT);LS(DASH,2,CSTLN)","5","S","STANDARD","22010"
"CBLARE","","SY(CBLARE51);LC(CBLARE51);CS(RESTRN01)","3","S","STANDARD","26230"
"CHKPNT","","SY(POSGEN04)","4","S","OTHER","32410"
"CONVYR","","TE('clr %4.1lf','VERCLR',3,1,2,'15110',1,0,CHBLK,11);LS(SOLD,3,CHGRD)","8","O","DISPLAYBASE","12210"
"CONVYR","CONRAD1`r","SY(RACNSP01);TE('clr %4.1lf','VERCLR',3,1,2,'15110',1,0,CHBLK,11);LS(SOLD,3,CHGRD)","8","O","DISPLAYBASE","12210"
"CONVYR","CONRAD3`r","SY(RACNSP01);TE('clr %4.1lf','VERCLR',3,1,2,'15110',1,0,CHBLK,11);LS(SOLD,3,CHGRD)","8","O","DISPLAYBASE","12210"
"CONZNE","","LS(DASH,2,CHGRF)","2","S","OTHER","36050"
"COSARE","","LS(DASH,2,CHGRF)","2","S","OTHER","36010"
"CRANES","","AC(CHBRN);LS(SOLD,1,LANDF)","4","S","OTHER","32440"
"CRANES","CONVIS1`r","AC(CHBRN);LS(SOLD,1,CHBLK)","4","S","STANDARD","22220"
"CTNARE","","SY(CTNARE51);LC(CTNARE51)","3","S","STANDARD","26050"
"CTSARE","","SY(INFARE51);LC(CTYARE51)","3","S","STANDARD","26250"
"CUSZNE","","LS(DASH,1,CHGRF)","2","S","OTHER","36020"
"DAMCON","","AC(CHBRN);LS(SOLD,1,LANDF)","3","S","STANDARD","22010"
"DAMCON","CATDAM3`r","AC(CHBRN);LS(SOLD,2,CSTLN)","6","S","DISPLAYBASE","12410"
"DEPARE","","CS(DEPARE01)","1","S","DISPLAYBASE","13030"
"DEPARE","DRVAL1?`rDRVAL2?`r","AC(NODTA);AP(PRTSUR01);LS(SOLD,2,CHGRD)","1","S","DISPLAYBASE","13030"
"DMPGRD","","SY(INFARE51);LC(CTYARE51);CS(RESTRN01)","3","S","STANDARD","26240"
"DMPGRD","CATDPG5`r","LC(NAVARE51);CS(RESTRN01)","3","S","STANDARD","26240"
"DOCARE","","AC(DEPVS);TX(OBJNAM,1,2,3,'15110',0,0,CHBLK,26);LS(SOLD,1,CHBLK)","2","S","DISPLAYBASE","12420"
"DOCARE","CONDTN`r","AC(DEPVS);TX(OBJNAM,1,2,3,'15110',0,0,CHBLK,26);LS(DASH,1,CHBLK)","2","S","DISPLAYBASE","12420"
"DRGARE","","CS(DEPARE01)","1","S","DISPLAYBASE","13030"
"DRYDOC","","AC(LANDA);LS(SOLD,1,CSTLN)","4","S","OTHER","32440"
"DWRTPT","","SY(TSLDEF51);SY(DWRTPT51);LC(DWRUTE51);CS(RESTRN01)","4","S","DISPLAYBASE","15010"
"DWRTPT","ORIENT`rTRAFIC1`r","SY(TSSLPT51,ORIENT);SY(DWRTPT51);LC(DWRUTE51);CS(RESTRN01)","4","S","DISPLAYBASE","15010"
"DWRTPT","ORIENT`rTRAFIC2`r","SY(TSSLPT51,ORIENT);SY(DWRTPT51);LC(DWRUTE51);CS(RESTRN01)","4","S","DISPLAYBASE","15010"
"DWRTPT","ORIENT`rTRAFIC3`r","SY(TSSLPT51,ORIENT);SY(DWRTPT51);LC(DWRUTE51);CS(RESTRN01)","4","S","DISPLAYBASE","15010"
"DWRTPT","ORIENT`rTRAFIC4`r","SY(DWRUTE51,ORIENT);SY(DWRTPT51);LC(DWRUTE51);CS(RESTRN01)","4","S","DISPLAYBASE","15010"
"DYKCON","","AC(CHBRN);LS(SOLD,1,LANDF)","3","S","STANDARD","22010"
"EXEZNE","","LS(DASH,2,CHGRF)","2","S","OTHER","36050"
"FAIRWY","","LC(NAVARE51);CS(RESTRN01)","4","S","STANDARD","26050"
"FAIRWY","ORIENT`rTRAFIC1`r","SY(FAIRWY51,ORIENT);LC(NAVARE51);CS(RESTRN01)","4","S","STANDARD","26050"
"FAIRWY","ORIENT`rTRAFIC2`r","SY(FAIRWY51,ORIENT);LC(NAVARE51);CS(RESTRN01)","4","S","STANDARD","26050"
"FAIRWY","ORIENT`rTRAFIC3`r","SY(FAIRWY51,ORIENT);LC(NAVARE51);CS(RESTRN01)","4","S","STANDARD","26050"
"FAIRWY","ORIENT`rTRAFIC4`r","SY(FAIRWY52,ORIENT);LC(NAVARE51);CS(RESTRN01)","4","S","STANDARD","26050"
"FERYRT","","SY(FRYARE51);LC(NAVARE51)","3","S","STANDARD","26040"
"FERYRT","CATFRY2`r","SY(FRYARE52);LC(NAVARE51)","3","S","STANDARD","26040"
"FLODOC","","AC(CHBRN);LS(SOLD,2,CSTLN)","5","S","DISPLAYBASE","12410"
"FORSTC","","AC(CHBRN);LS(SOLD,1,LANDF)","4","S","OTHER","32220"
"FORSTC","CONVIS1`r","AC(CHBRN);LS(SOLD,1,CHBLK)","4","S","STANDARD","22220"
"FRPARE","","LS(DASH,2,CHGRF)","2","S","OTHER","36020"
"FSHFAC","","SY(FSHFAC02);LC(NAVARE51)","4","S","OTHER","34040"
"FSHFAC","CATFIF1`r","SY(FSHFAC03);LC(NAVARE51)","4","S","OTHER","34040"
"FSHFAC","CATFIF2`r","SY(FSHFAC02);LC(NAVARE51)","4","S","OTHER","34040"
"FSHFAC","CATFIF3`r","SY(FSHFAC02);LC(NAVARE51)","4","S","OTHER","34040"
"FSHFAC","CATFIF4`r","SY(FSHFAC02);LC(NAVARE51)","4","S","OTHER","34040"
"FSHGRD","","SY(FSHGRD01);LS(DASH,2,CHGRF)","3","S","STANDARD","26210"
"FSHZNE","","LS(DASH,2,CHGRF)","2","S","OTHER","36040"
"GATCON","","AC(CHBRN);LS(SOLD,2,CSTLN)","8","S","DISPLAYBASE","12410"
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"GRIDRN","","LS(DASH,1,CHGRD)","5","S","OTHER","32460"
"HRBARE","","LC(NAVARE51)","2","S","OTHER","36020"
"HRBFAC","","SY(CHINFO07)","4","S","OTHER","32410"
"HRBFAC","CATHAF1\r","SY(ROLROL01)","4","S","OTHER","32410"
"HRBFAC","CATHAF4\r","SY(HRBFAC09)","4","S","OTHER","32410"
"HRBFAC","CATHAF5\r","SY(SMCFAC02)","4","S","OTHER","32410"
"HULKES","","AC(CHBRN);LS(SOLD,2,CSTLN)","5","S","DISPLAYBASE","12410"
"ICEARE","","AC(NODTA);AP(ICEARE04);LS(DASH,1,CHGRD)","3","S","DISPLAYBASE","12410"
"ICNARE","","SY(INFARE51);LC(CTYARE51);CS(RESTRN01)","3","S","STANDARD","26250"
"ISTZNE","","SY(ITZARE51);LC(RESARE51);CS(RESTRN01)","5","S","DISPLAYBASE","15010"
"LAKARE","","AC(DEPVS);LS(SOLD,1,CHBLK)","2","S","OTHER","32050"
"LNDARE","","AC(LANDA)","1","S","DISPLAYBASE","12010"
"LNDMRK","","AC(CHBRN);LS(SOLD,1,LANDF)","4","S","OTHER","32220"
"LNDMRK","CATLMK17\rFUNCTN33\rCONVIS1\r","AC(CHBRN);TX(OBJNAM,1,2,2,'15110',0,0,CHBLK,26);LS(SOLD,1,CHBLK)","4","S","STANDARD","2222
0"
"LNDMRK","CATLMK17\rFUNCTN33\r","AC(CHBRN);TX(OBJNAM,1,2,2,'15110',0,0,CHBLK,26);LS(SOLD,1,LANDF)","4","S","OTHER","32220"
"LNDMRK","CONVIS1\r","AC(CHBRN);LS(SOLD,1,CHBLK)","4","S","STANDARD","22220"
"LNDRGN","","TX(OBJNAM,1,2,3,'15110',0,0,CHBLK,26)","3","S","STANDARD","21060"
"LNDRGN","CATLND2\r","AP(MARSHES1)","3","S","STANDARD","21060"
"LNDRGN","CATLND12\r","AP(MARSHES1)","3","S","STANDARD","21060"
"LOCMAG","","SY(LOCMAG51);LC(NAVARE51)","4","S","OTHER","31080"
"LOGPON","","LS(DASH,1,CHBLK)","5","S","DISPLAYBASE","12410"
"LOKBSN","","AC(DEPVS);LS(SOLD,1,CHBLK)","2","S","DISPLAYBASE","12420"
"M_ACCY","","","","S","",""
"M_COVR","","CS(DATCVR01)","1","S","OTHER","31040"
"M_CSCL","","CS(DATCVR01)","1","S","OTHER","31040"
"M_HOPA","","","","S","",""
"M_NPUB","","","","S","",""
"M_NSYS","","LC(MARSYS51)","4","S","STANDARD","27040"
"M_NSYS","MARSYS1\rORIENT\r","SY(DIRBOYA1,ORIENT);LC(NAVARE51)","4","S","STANDARD","27040"
"M_NSYS","MARSYS2\rORIENT\r","SY(DIRBOYB1,ORIENT);LC(NAVARE51)","4","S","STANDARD","27040"
"M_NSYS","ORIENT\r","SY(DIRBOY01,ORIENT);LC(NAVARE51)","4","S","STANDARD","27040"
"M_QUAL","","AP(NODATA03);LS(DASH,2,CHGRD)","4","S","OTHER","31010"
"M_QUAL","CATZOC1\r","AP(DQUALA11);LS(DASH,2,CHGRD)","4","S","OTHER","31010"
"M_QUAL","CATZOC2\r","AP(DQUALA21);LS(DASH,2,CHGRD)","4","S","OTHER","31010"
"M_QUAL","CATZOC3\r","AP(DQUALB01);LS(DASH,2,CHGRD)","4","S","OTHER","31010"
"M_QUAL","CATZOC4\r","AP(DQUALC01);LS(DASH,2,CHGRD)","4","S","OTHER","31010"
"M_QUAL","CATZOC5\r","AP(DQUALD01);LS(DASH,2,CHGRD)","4","S","OTHER","31010"
"M_QUAL","CATZOC6\r","AP(DQUALU01);LS(DASH,2,CHGRD)","4","S","OTHER","31010"
"M_SDAT","","","","S","",""
"M_SREL","","","","S","",""
"M_VDAT","","","","S","",""
"MAGVAR","","SY(MAGVAR51)","4","S","OTHER","31080"
"MARCUL","","AP(MARCUL02);LC(NAVARE51);CS(RESTRN01)","3","S","STANDARD","26210"
"MIPARE","","SY(CTYARE51);LC(CTYARE51);CS(RESTRN01)","4","S","STANDARD","26040"
"MORFAC","","AC(CHBRN);LS(SOLD,1,CHBLK)","6","S","DISPLAYBASE","12410"
"OBSTRN","","CS(OBSTRN04)","4","S","OTHER","34050"
"OBSTRN","CATOBS6\r"," CS(OBSTRN04); AP(FOULAR01);LS(DOTT,2,CHBLK)","4","S","OTHER","34050"
"OBSTRN","CATOBS7\r","SY(FOULGND1);LC(NAVARE51)","4","S","OTHER","34050"
"OFSPLF","","AC(CHBRN);LS(SOLD,4,CSTLN);TE('Prod %s','OBJNAM',3,1,2,'15110',1,-1,CHBLK,21)","5","O","DISPLAYBASE","12210"
"OSPARE","","SY(CTYARE51);LC(CTYARE51);CS(RESTRN01)","4","S","STANDARD","26040"
"PILBOP","","SY(PILBOP02);LC(CTYARE51)","4","S","STANDARD","28010"
"PIPARE","","SY(INFARE51);LC(PIPARE51);CS(RESTRN01)","3","S","STANDARD","26230"
"PIPARE","CATPIP2\r","SY(INFARE51);LC(PIPARE61);CS(RESTRN01)","3","S","STANDARD","26230"
"PIPARE","CATPIP3\r","SY(INFARE51);LC(PIPARE61);CS(RESTRN01)","3","S","STANDARD","26230"
"PIPARE","PRODCT3\r","SY(INFARE51);LC(PIPARE61);CS(RESTRN01)","3","S","STANDARD","26230"
"PONTON","","AC(CHBRN);LS(SOLD,2,CSTLN)","5","S","DISPLAYBASE","12410"
"PRCARE","","AP(TSSJCT02);SY(PRCARE51);LC(PRCARE51);CS(RESTRN01)","4","S","DISPLAYBASE","15010"
"PRDARE","","LS(DASH,1,LANDF)","4","S","OTHER","32270"
"PRDARE","CATPRA5\rCONVIS1\r","SY(RFNERY11);LS(DASH,1,CHBLK)","4","S","STANDARD","22220"
"PRDARE","CATPRA8\rCONVIS1\r","SY(TNKFRM11);LS(DASH,1,CHBLK)","4","S","STANDARD","22220"
"PRDARE","CATPRA9\rCONVIS1\r","SY(WNDFRM61);LS(DASH,1,CHBLK)","4","S","STANDARD","22220"
"PRDARE","CATPRA1\r","SY(QUARRY01);LS(DASH,1,LANDF)","4","S","OTHER","32270"
"PRDARE","CATPRA5\r","SY(RFNERY01);LS(DASH,1,LANDF)","4","S","OTHER","32270"
"PRDARE","CATPRA6\r","SY(TMBYRD01);LS(DASH,1,LANDF)","4","S","OTHER","32270"
"PRDARE","CATPRA8\r","SY(TNKFRM01);LS(DASH,1,LANDF)","4","S","OTHER","32270"
"PRDARE","CATPRA9\r","SY(WNDFRM51);LS(DASH,1,LANDF)","4","S","OTHER","32270"
"PYLONS","","AC(CHBRN);LS(SOLD,2,CSTLN)","8","S","DISPLAYBASE","12210"
"RADRNG","","LS(DASH,1,TRFCF)","3","S","STANDARD","25040"
"RAPIDS","","AC(CHGRD)","3","S","OTHER","32050"
"RCTLPT","","SY(RTLDEF51)","4","S","DISPLAYBASE","15020"
"RCTLPT","ORIENT\r","SY(RCTLPT52,ORIENT)","4","S","DISPLAYBASE","15020"
"RECTRC","","SY(RECDEF51);LC(NAVARE51)","6","S","STANDARD","25020"
"RECTRC","ORIENT\rCATTRK1\rTRAFIC1\r","SY(RECTRC58,ORIENT);TE('%03.0lf
deg','ORIENT',3,2,2,'15110',4,0,CHBLK,11);LC(NAVARE51)","6","S","STANDARD","25020"
"RECTRC","ORIENT\rCATTRK1\rTRAFIC2\r","SY(RECTRC58,ORIENT);TE('%03.0lf
deg','ORIENT',3,2,2,'15110',4,0,CHBLK,11);LC(NAVARE51)","6","S","STANDARD","25020"
"RECTRC","ORIENT\rCATTRK1\rTRAFIC3\r","SY(RECTRC58,ORIENT);TE('%03.0lf
deg','ORIENT',3,2,2,'15110',4,0,CHBLK,11);LC(NAVARE51)","6","S","STANDARD","25020"
"RECTRC","ORIENT\rCATTRK1\rTRAFIC4\r","SY(RECTRC56,ORIENT);TE('%03.0lf
deg','ORIENT',3,2,2,'15110',4,0,CHBLK,11);LC(NAVARE51)","6","S","STANDARD","25020"
"RECTRC","ORIENT\rCATTRK2\rTRAFIC1\r","SY(RECTRC57,ORIENT);TE('%03.0lf
deg','ORIENT',3,2,2,'15110',4,0,CHBLK,11);LC(NAVARE51)","6","S","STANDARD","25020"
"RECTRC","ORIENT\rCATTRK2\rTRAFIC2\r","SY(RECTRC57,ORIENT);TE('%03.0lf
deg','ORIENT',3,2,2,'15110',4,0,CHBLK,11);LC(NAVARE51)","6","S","STANDARD","25020"

"RECTRC","ORIENT\CATTRK2\TRAFIC3\","SY(RECTRC57,ORIENT);TE('%03.0lf
deg','ORIENT',3,2,2,'15110',4,0,CHBLK,11);LC(NAVARE51)","6","S","STANDARD","25020"
"RECTRC","ORIENT\CATTRK2\TRAFIC4\","SY(RECTRC55,ORIENT);TE('%03.0lf
deg','ORIENT',3,2,2,'15110',4,0,CHBLK,11);LC(NAVARE51)","6","S","STANDARD","25020"
"RECTRC","ORIENT\TRAFIC1\","SY(RECTRC57,ORIENT);TE('%03.0lf
deg','ORIENT',3,2,2,'15110',4,0,CHBLK,11);LC(NAVARE51)","6","S","STANDARD","25020"
"RECTRC","ORIENT\TRAFIC2\","SY(RECTRC57,ORIENT);TE('%03.0lf
deg','ORIENT',3,2,2,'15110',4,0,CHBLK,11);LC(NAVARE51)","6","S","STANDARD","25020"
"RECTRC","ORIENT\TRAFIC3\","SY(RECTRC57,ORIENT);TE('%03.0lf
deg','ORIENT',3,2,2,'15110',4,0,CHBLK,11);LC(NAVARE51)","6","S","STANDARD","25020"
"RECTRC","ORIENT\TRAFIC4\","SY(RECTRC55,ORIENT);TE('%03.0lf
deg','ORIENT',3,2,2,'15110',4,0,CHBLK,11);LC(NAVARE51)","6","S","STANDARD","25020"
"RESARE","","CS(RESARE02)","5","S","STANDARD","26010"
"RIVERS","","AC(DEPVS);LS(SOLD,1,CHBLK)","2","S","OTHER","32050"
"ROADWY","","AC(LANDA);LS(SOLD,1,LANDF)","4","S","OTHER","32250"
"RUNWAY","","AC(CHBRN)","5","S","OTHER","32240"
"RUNWAY","CONVIS1\","AC(CHBRN);LS(SOLD,1,CHBLK)","5","S","STANDARD","22220"
"SBDARE","","","","S","",""
"SBDARE","WATLEV3\NATSUR\","TX(NATSUR,1,2,2,'15110',0,0,CHBLK,25);LS(DASH,1,CHGRD)","3","S","OTHER","34010"

"SBDARE","WATLEV4\NATSUR9\","AP(RCKLDG01);LS(DASH,1,CHGRD)","3","S","OTHER","34010"
"SBDARE","WATLEV4\NATSUR11\","AP(RCKLDG01);LS(DASH,1,CHGRD)","3","S","OTHER","34010"
"SBDARE","WATLEV4\NATSUR14\","AP(RCKLDG01);LS(DASH,1,CHGRD)","3","S","OTHER","34010"
"SBDARE","WATLEV4\NATSUR\","TX(NATSUR,1,2,2,'15110',0,0,CHBLK,25);LS(DASH,1,CHGRD)","3","S","OTHER","34010"
"SEAARE","","TX(OBJNAM,1,2,3,'15110',0,0,CHBLK,26)","3","S","STANDARD","21060"
"SILTNK","","AC(CHBRN);LS(SOLD,1,LANDF)","4","S","OTHER","32220"
"SILTNK","CONVIS1\","AC(CHBRN);LS(SOLD,1,CHBLK)","4","S","STANDARD","22220"
"SLCONS","","CS(SLCONS03)","7","O","DISPLAYBASE","12410"
"SLOGRD","","","","S","",""
"SLOGRD","CATSLO6\","AC(CHGRD);LS(SOLD,1,CHBLK)","3","S","OTHER","32010"
"SMCFAC","","AC(CHBRN);SY(SMCFAC02);LS(SOLD,1,LANDF)","4","S","OTHER","38210"
"SNDWAV","","AP(SNDWAV01);LC(NAVARE51)","4","S","STANDARD","24010"
"SPLARE","","SY(CTYARE51);LC(CTYARE51);CS(RESTRN01)","4","S","STANDARD","26040"
"SUBTLN","","SY(CTYARE51);LC(CTYARE51);CS(RESTRN01)","4","S","STANDARD","26040"
"SWPARE","","SY(SWPARE51);TE('swept to %5.1lf','DRVAL1',1,2,2,'15110',0,1,CHBLK,27);LC(NAVARE51)","4","S","STANDARD","23030"
"T_HMON","","SY(TIDEHT01);LC(TIDINF51)","2","S","OTHER","33050"
"T_NHMN","","SY(TIDEHT01);LC(TIDINF51)","2","S","OTHER","33050"
"T_TIMS","","SY(TIDEHT01);LC(TIDINF51)","2","S","OTHER","33050"
"TS_FEB","","SY(CURDEF01);LC(TIDINF51)","2","S","OTHER","33060"
"TS_FEB","CAT_TS1\ORIENT\","SY(FLDSTR01,ORIENT);TE('%4.1lf kn','CURVEL',3,1,2,'15110',1,-1,CHBLK,31)","4","S","OTHER","33060"
"TS_FEB","CAT_TS2\ORIENT\","SY(EBBSTR01,ORIENT);TE('%4.1lf kn','CURVEL',3,1,2,'15110',1,-1,CHBLK,31)","4","S","OTHER","33060"
"TS_FEB","CAT_TS3\ORIENT\","SY(CURENT01,ORIENT);TE('%4.1lf kn','CURVEL',3,1,2,'15110',1,-1,CHBLK,31)","4","S","OTHER","33060"
"TS_PAD","","SY(TIDSTR01);LC(TIDINF51)","2","S","OTHER","33060"
"TS_PNH","","SY(TIDSTR01);LC(TIDINF51)","2","S","OTHER","33060"
"TS_PRH","","SY(TIDSTR01);LC(TIDINF51)","2","S","OTHER","33060"
"TS_TIS","","SY(TIDSTR01);LC(TIDINF51)","2","S","OTHER","33060"
"TESARE","","LS(DASH,2,CHGRF);CS(RESTRN01)","2","S","OTHER","36050"
"TIDEWY","","TX(OBJNAM,1,2,3,'15110',0,0,CHBLK,25)","7","S","OTHER","32070"
"TSEZNE","","AC(TRFCF,3)","4","S","DISPLAYBASE","15010"
"TSSCRS","","AP(TSSJCT02);SY(TSSCRS51);CS(RESTRN01)","6","S","DISPLAYBASE","15010"
"TSSLPT","","AP(TSSJCT02);SY(CTNARE51);TX(INFORM,1,1,2,'15110',0,-2,CHBLK,24);CS(RESTRN01)","6","S","DISPLAYBASE","15010"
"TSSLPT","ORIENT\","SY(TSSLPT51,ORIENT);CS(RESTRN01)","6","S","DISPLAYBASE","15010"
"TSSRON","","AP(TSSJCT02);SY(TSSRON51);CS(RESTRN01)","6","S","DISPLAYBASE","15010"
"TUNNEL","","LS(DASH,1,CHGRD)","4","S","OTHER","32250"
"TUNNEL","BURDEP0\","AC(DEPVS);LS(DASH,1,CHBLK)","4","S","STANDARD","24010"
"TWRTPT","","SY(TWRDEF51);LC(CTYARE51)","4","S","DISPLAYBASE","15010"
"TWRTPT","ORIENT\TRAFIC1\","SY(TWRTPT53,ORIENT);LC(CTYARE51)","4","S","DISPLAYBASE","15010"
"TWRTPT","ORIENT\TRAFIC2\","SY(TWRTPT53,ORIENT);LC(CTYARE51)","4","S","DISPLAYBASE","15010"
"TWRTPT","ORIENT\TRAFIC3\","SY(TWRTPT53,ORIENT);LC(CTYARE51)","4","S","DISPLAYBASE","15010"
"TWRTPT","ORIENT\TRAFIC4\","SY(TWRTPT52,ORIENT);LC(CTYARE51)","4","S","DISPLAYBASE","15010"
"UNSARE","","AC(NODTA);AP(NODATA03);LS(SOLD,2,CHGRD)","0","S","DISPLAYBASE","11050"
"VEGATN","","","","S","",""
"VEGATN","CATVEG7\","AP(VEGATN04);LS(DASH,1,LANDF)","3","S","OTHER","32030"
"VEGATN","CATVEG21\","AP(VEGATN04);LS(DASH,1,LANDF)","3","S","OTHER","32030"
"VEGATN","CATVEG3\","AP(VEGATN03);LS(DASH,1,LANDF)","3","S","OTHER","32030"
"VEGATN","CATVEG4\","AP(VEGATN03);LS(DASH,1,LANDF)","3","S","OTHER","32030"
"VEGATN","CATVEG5\","AP(VEGATN03);LS(DASH,1,LANDF)","3","S","OTHER","32030"
"VEGATN","CATVEG6\","AP(VEGATN03);LS(DASH,1,LANDF)","3","S","OTHER","32030"
"VEGATN","CATVEG13\","AP(VEGATN03);LS(DASH,1,LANDF)","3","S","OTHER","32030"
"VEGATN","CATVEG14\","AP(VEGATN03);LS(DASH,1,LANDF)","3","S","OTHER","32030"
"VEGATN","CATVEG15\","AP(VEGATN03);LS(DASH,1,LANDF)","3","S","OTHER","32030"
"VEGATN","CATVEG16\","AP(VEGATN03);LS(DASH,1,LANDF)","3","S","OTHER","32030"
"VEGATN","CATVEG17\","AP(VEGATN03);LS(DASH,1,LANDF)","3","S","OTHER","32030"
"VEGATN","CATVEG18\","AP(VEGATN03);LS(DASH,1,LANDF)","3","S","OTHER","32030"
"VEGATN","CATVEG19\","AP(VEGATN03);LS(DASH,1,LANDF)","3","S","OTHER","32030"
"VEGATN","CATVEG20\","AP(VEGATN03);LS(DASH,1,LANDF)","3","S","OTHER","32030"
"VEGATN","CATVEG22\","AP(VEGATN03);LS(DASH,1,LANDF)","3","S","OTHER","32030"
"WATTUR","","SY(WATTUR02);LS(DASH,1,CHGRD)","4","S","OTHER","33040"
"WEDKLP","","SY(WEDKLP03);LS(DASH,1,CHGRF)","3","O","OTHER","34020"
"WRECKS","","CS(WRECKS02)","4","S","OTHER","34050"
"WRECKS","CATWRK3\","LC(NAVARE51)","4","S","OTHER","34050"
*
* ***  ***
* *** section two: NON-STANDARD CLASSES ***

```
* ***                          ***
*
*Note: category "DISPLAYBASE" should not be removed from the display.
*For non-standard classes, all category "MARINERS STANDARD" and "MARINERS OTHER"
*should be drawn when "STANDARD DISPLAY" is drawn, and therefore may be re-assigned
*to the category of choosen by the mariner.
*
"dnghlt","","AC(DNGHL,3);LS(SOLD,3,DNGHL)","8","O","MARINERS STANDARD","53010"
"marfea","","AC(ADINF,3);TX(OBJNAM,1,2,3,'15110',0,0,CHBLK,50);LS(SOLD,2,NINFO);LS(SOLD,1,CHBLK);","8","S","MARINERS STANDARD","53050"
"mnufea","","LS(DASH,2,ADINF)","5","S","MARINERS STANDARD","55010"
*
* ***                  ***
* *** end of look-up table ***
* ***                  ***
```

### 11.3.2 Look-up table for areas with plain boundaries

```
* *** AREAS WITH PLAIN BOUNDARIES                ***
* *** This is the look-up table for area symbolization.  ***
* *** For edition 3.2 Preslib, dated March  2000        ***
*
* Each line contains minimum 6 fields:
*  1. field - code of the object class
*  2. field - attribute combination
*  3. field - symbolization instruction
*  4. field - display priority
*  5. field - radar
*  6. field - IMO display category
*  7. field - viewing group (optional)
*
* Each field entry is framed by "'" and fields are separated by ','.
*
* Please note, that the entries to this table must be in
* alphabetic order (sorted by the class code).
*
* This table has 2 sections:
*
* - The first section contains symbolization instructions for
*   standard S-57 'real world' objects:
* - The second section contains symbolization instructions for
*   non-standard (class code in lowercase) objects:
*
* default for symbolization failure; must be the first entry to look-up table
"######","","AP(QUESMRK1);LS(DASH,1,CHMGD)","5","S","STANDARD","21010"
*
* ***                          ***
* *** section one: REAL WORLD CLASSES ***
* ***                          ***
*
"ACHARE","","SY(ACHARE51);LS(DASH,2,CHMGF);CS(RESTRN01)","3","S","STANDARD","26220"
"ACHARE","CATACH8`","SY(ACHARE02);LS(DASH,2,CHMGF);CS(RESTRN01)","3","S","STANDARD","26220"
"ACHBRT","","SY(ACHBRT07);TE('No %s','OBJNAM',3,1,2,'15110',1,0,CHBLK,29);LS(DASH,2,CHMGF)","5","S","STANDARD","26220"
"ADMARE","","LS(DASH,2,CHGRF)","2","S","OTHER","36050"
"AIRARE","","AP(AIRARE02);LS(SOLD,1,LANDF)","2","S","OTHER","32240"
"AIRARE","CONVIS1`","AC(LANDA);AP(AIRARE02);LS(SOLD,1,CHBLK)","2","S","STANDARD","22220"
"BERTHS","","SY(BRTHNO01);TE('No %s','OBJNAM',3,1,2,'15110',1,0,CHBLK,29)","3","S","OTHER","32440"
"BRIDGE","","TX(OBJNAM,3,1,2,'15110',1,0,CHBLK,21);TE('clr
%4.1lf','VERCLR',3,1,2,'15110',1,1,CHBLK,11);LS(SOLD,4,CHGRD)","8","O","DISPLAYBASE","12210"
"BRIDGE","CATBRG2`","SY(BRIDGE01);TE('clrcl%4.1lf','VERCCL',3,1,2,'15110',1,0,CHBLK,11);TE('clrop
%4.1lf','VERCOP',3,1,2,'15110',1,1,CHBLK,11);LS(SOLD,4,CHGRD)","8","O","DISPLAYBASE","12210"
"BRIDGE","CATBRG3`","SY(BRIDGE01);TE('clrcl%4.1lf','VERCCL',3,1,2,'15110',1,0,CHBLK,11);TE('clrop
%4.1lf','VERCOP',3,1,2,'15110',1,1,CHBLK,11);LS(SOLD,4,CHGRD)","8","O","DISPLAYBASE","12210"
"BRIDGE","CATBRG4`","SY(BRIDGE01);TE('clrcl%4.1lf','VERCCL',3,1,2,'15110',1,0,CHBLK,11);TE('clrop
%4.1lf','VERCOP',3,1,2,'15110',1,1,CHBLK,11);LS(SOLD,4,CHGRD)","8","O","DISPLAYBASE","12210"
"BRIDGE","CATBRG5`","SY(BRIDGE01);TE('clrcl%4.1lf','VERCCL',3,1,2,'15110',1,0,CHBLK,11);TE('clrop
%4.1lf','VERCOP',3,1,2,'15110',1,1,CHBLK,11);LS(SOLD,4,CHGRD)","8","O","DISPLAYBASE","12210"
"BRIDGE","CATBRG7`","SY(BRIDGE01);TE('clrcl%4.1lf','VERCCL',3,1,2,'15110',1,0,CHBLK,11);TE('clrop
%4.1lf','VERCOP',3,1,2,'15110',1,1,CHBLK,11);LS(SOLD,4,CHGRD)","8","O","DISPLAYBASE","12210"
"BRIDGE","CATBRG8`","SY(BRIDGE01);TE('clrcl%4.1lf','VERCCL',3,1,2,'15110',1,0,CHBLK,11);TE('clrop
%4.1lf','VERCOP',3,1,2,'15110',1,1,CHBLK,11);LS(SOLD,4,CHGRD)","8","O","DISPLAYBASE","12210"
"BUAARE","","AC(CHBRN);TX(OBJNAM,1,2,3,'15110',0,0,CHBLK,26);LS(SOLD,1,LANDF)","3","S","STANDARD","22240"
"BUISGL","","AC(CHBRN);LS(SOLD,1,LANDF)","4","S","OTHER","32220"
```

"BUISGL","FUNCTN33`CONVIS1`","AC(CHBRN);TX(OBJNAM,1,2,2,'15110',0,0,CHBLK,26);LS(SOLD,1,CHBLK)","4","S","STANDARD","22220"
"BUISGL","FUNCTN33`","AC(CHBRN);TX(OBJNAM,1,2,2,'15110',0,0,CHBLK,26);LS(SOLD,1,LANDF)","4","S","OTHER","32220"
"BUISGL","CONVIS1`","AC(CHBRN);LS(SOLD,1,CHBLK)","4","S","STANDARD","22220"
"CANALS","","AC(DEPVS);LS(SOLD,1,CHBLK)","2","S","DISPLAYBASE","12420"
"CANALS","CONDTN`","AC(DEPVS);LS(DASH,1,CHBLK)","2","S","DISPLAYBASE","12420"
"CAUSWY","","AC(CHBRN);LS(SOLD,1,CSTLN)","5","S","STANDARD","22010"
"CAUSWY","WATLEV4`","AC(DEPIT);LS(DASH,2,CSTLN)","5","S","STANDARD","22010"
"CBLARE","","SY(CBLARE51);LS(DASH,2,CHMGD);CS(RESTRN01)","3","S","STANDARD","26230"
"CHKPNT","","SY(POSGEN04)","4","S","OTHER","32410"
"CONVYR","","TE('clr %4.1lf','VERCLR',3,1,2,'15110',1,0,CHBLK,11);LS(SOLD,3,CHGRD)","8","O","DISPLAYBASE","12210"
"CONVYR","CONRAD1`","SY(RACNSP01);TE('clr %4.1lf','VERCLR',3,1,2,'15110',1,0,CHBLK,11);LS(SOLD,3,CHGRD)","8","O","DISPLAYBASE","12210"
"CONVYR","CONRAD3`","SY(RACNSP01);TE('clr %4.1lf','VERCLR',3,1,2,'15110',1,0,CHBLK,11);LS(SOLD,3,CHGRD)","8","O","DISPLAYBASE","12210"

"CONZNE","","LS(DASH,2,CHGRF)","2","S","OTHER","36050"
"COSARE","","LS(DASH,2,CHGRF)","2","S","OTHER","36010"
"CRANES","","AC(CHBRN);LS(SOLD,1,LANDF)","4","S","OTHER","32440"
"CRANES","CONVIS1`","AC(CHBRN);LS(SOLD,1,CHBLK)","4","S","STANDARD","22220"
"CTNARE","","SY(CTNARE51);LS(DASH,2,TRFCD)","3","S","STANDARD","26050"
"CTSARE","","SY(INFARE51);LS(DASH,1,CHMGF)","3","S","STANDARD","26250"
"CUSZNE","","LS(DASH,1,CHGRF)","2","S","OTHER","36020"
"DAMCON","","AC(CHBRN);LS(SOLD,1,LANDF)","3","S","STANDARD","22010"
"DAMCON","CATDAM3`","AC(CHBRN);LS(SOLD,2,CSTLN)","6","S","DISPLAYBASE","12410"
"DEPARE","","CS(DEPARE01)","1","S","DISPLAYBASE","13030"
"DEPARE","DRVAL1?`DRVAL2?`","AC(NODTA);AP(PRTSUR01);LS(SOLD,2,CHGRD)","1","S","DISPLAYBASE","13030"
"DMPGRD","","SY(INFARE51);LS(DASH,1,CHMGD);CS(RESTRN01)","3","S","STANDARD","26240"
"DMPGRD","CATDPG5`","LS(DASH,1,CHMGD);CS(RESTRN01)","3","S","STANDARD","26240"
"DOCARE","","AC(DEPVS);TX(OBJNAM,1,2,3,'15110',0,0,CHBLK,26);LS(SOLD,1,CHBLK)","2","S","DISPLAYBASE","12420"
"DOCARE","CONDTN`","AC(DEPVS);TX(OBJNAM,1,2,3,'15110',0,0,CHBLK,26);LS(DASH,1,CHBLK)","2","S","DISPLAYBASE","12420"
"DRGARE","","CS(DEPARE01)","1","S","DISPLAYBASE","13030"
"DRYDOC","","AC(LANDA);LS(SOLD,1,CSTLN)","4","S","OTHER","32440"
"DWRTPT","","SY(TSLDEF51);SY(DWRTPT51);LS(DASH,3,TRFCD);CS(RESTRN01)","4","S","DISPLAYBASE","15010"
"DWRTPT","ORIENT`TRAFIC1`","SY(TSSLPT51,ORIENT);SY(DWRTPT51);LS(DASH,3,TRFCD);CS(RESTRN01)","4","S","DISPLAYBASE","15010"
"DWRTPT","ORIENT`TRAFIC2`","SY(TSSLPT51,ORIENT);SY(DWRTPT51);LS(DASH,3,TRFCD);CS(RESTRN01)","4","S","DISPLAYBASE","15010"
"DWRTPT","ORIENT`TRAFIC3`","SY(TSSLPT51,ORIENT);SY(DWRTPT51);LS(DASH,3,TRFCD);CS(RESTRN01)","4","S","DISPLAYBASE","15010"
"DWRTPT","ORIENT`TRAFIC4`","SY(DWRUTE51,ORIENT);SY(DWRTPT51);LS(DASH,3,TRFCD);CS(RESTRN01)","4","S","DISPLAYBASE","15010"
"DYKCON","","AC(CHBRN);LS(SOLD,1,LANDF)","3","S","STANDARD","22010"
"EXEZNE","","LS(DASH,2,CHGRF)","2","S","OTHER","36050"
"FAIRWY","","LS(DASH,1,CHGRD);CS(RESTRN01)","4","S","STANDARD","26050"
"FAIRWY","ORIENT`TRAFIC1`","SY(FAIRWY51,ORIENT);LS(DASH,1,CHGRD);CS(RESTRN01)","4","S","STANDARD","26050"
"FAIRWY","ORIENT`TRAFIC2`","SY(FAIRWY51,ORIENT);LS(DASH,1,CHGRD);CS(RESTRN01)","4","S","STANDARD","26050"
"FAIRWY","ORIENT`TRAFIC3`","SY(FAIRWY51,ORIENT);LS(DASH,1,CHGRD);CS(RESTRN01)","4","S","STANDARD","26050"
"FAIRWY","ORIENT`TRAFIC4`","SY(FAIRWY52,ORIENT);LS(DASH,1,CHGRD);CS(RESTRN01)","4","S","STANDARD","26050"
"FERYRT","","SY(FRYARE51);LS(DASH,2,CHMGD)","3","S","STANDARD","26040"
"FERYRT","CATFRY2`","SY(FRYARE52);LS(DASH,2,CHBLK)","3","S","STANDARD","26040"
"FLODOC","","AC(CHBRN);LS(SOLD,2,CSTLN)","5","S","DISPLAYBASE","12410"
"FORSTC","","AC(CHBRN);LS(SOLD,1,LANDF)","4","S","OTHER","32220"
"FORSTC","CONVIS1`","AC(CHBRN);LS(SOLD,1,CHBLK)","4","S","STANDARD","22220"
"FRPARE","","LS(DASH,2,CHGRF)","2","S","OTHER","36020"
"FSHFAC","","AP(FSHHAV02);LS(DASH,1,CHGRD)","4","S","OTHER","34040"
"FSHFAC","CATFIF1`","AP(FSHFAC03);LS(DASH,1,CHGRD)","4","S","OTHER","34040"
"FSHFAC","CATFIF2`","AP(FSHFAC04);LS(DASH,1,CHGRD)","4","S","OTHER","34040"
"FSHFAC","CATFIF3`","AP(FSHFAC04);LS(DASH,1,CHGRD)","4","S","OTHER","34040"
"FSHFAC","CATFIF4`","AP(FSHFAC04);LS(DASH,1,CHGRD)","4","S","OTHER","34040"
"FSHGRD","","SY(FSHGRD01);LS(DASH,2,CHGRF)","3","S","STANDARD","26210"
"FSHZNE","","LS(DASH,2,CHGRF)","2","S","OTHER","36040"
"GATCON","","AC(CHBRN);LS(SOLD,2,CSTLN)","8","S","DISPLAYBASE","12410"
"GRIDRN","","LS(DASH,1,CHGRD)","5","S","OTHER","32460"
"HRBARE","","LS(DASH,2,CHGRD)","2","S","OTHER","36020"
"HRBFAC","","SY(CHINFO07)","4","S","OTHER","32410"
"HRBFAC","CATHAF1`","SY(ROLROL01)","4","S","OTHER","32410"
"HRBFAC","CATHAF4`","SY(HRBFAC09)","4","S","OTHER","32410"
"HRBFAC","CATHAF5`","SY(SMCFAC02)","4","S","OTHER","32410"
"HULKES","","AC(CHBRN);LS(SOLD,2,CSTLN)","5","S","DISPLAYBASE","12410"
"ICEARE","","AC(NODTA);AP(ICEARE04);LS(DASH,1,CHGRD)","3","S","DISPLAYBASE","12410"
"ICNARE","","SY(INFARE51);LS(DASH,1,CHMGF);CS(RESTRN01)","3","S","STANDARD","26250"
"ISTZNE","","SY(ITZARE51);LS(DASH,1,TRFCD);CS(RESTRN01)","5","S","DISPLAYBASE","15010"
"LAKARE","","AC(DEPVS);LS(SOLD,1,CHBLK)","2","S","OTHER","32050"
"LNDARE","","AC(LANDA)","1","S","DISPLAYBASE","12010"
"LNDMRK","","AC(CHBRN);LS(SOLD,1,LANDF)","4","S","OTHER","32220"
"LNDMRK","CATLMK17`FUNCTN33`CONVIS1`","AC(CHBRN);TX(OBJNAM,1,2,2,'15110',0,0,CHBLK,26);LS(SOLD,1,CHBLK)","4","S","STANDARD","22220"
"LNDMRK","CATLMK17`FUNCTN33`","AC(CHBRN);TX(OBJNAM,1,2,2,'15110',0,0,CHBLK,26);LS(SOLD,1,LANDF)","4","S","OTHER","32220"
"LNDMRK","CONVIS1`","AC(CHBRN);LS(SOLD,1,CHBLK)","4","S","STANDARD","22220"
"LNDRGN","","TX(OBJNAM,1,2,3,'15110',0,0,CHBLK,26)","3","S","STANDARD","21060"
"LNDRGN","CATLND2`","AP(MARSHES1)","3","S","STANDARD","21060"
"LNDRGN","CATLND12`","AP(MARSHES1)","3","S","STANDARD","21060"
"LOCMAG","","SY(LOCMAG51);LS(DASH,1,CHGRD)","4","S","OTHER","31080"
"LOGPON","","LS(DASH,1,CHBLK)","5","S","DISPLAYBASE","12410"
"LOKBSN","","AC(DEPVS);LS(SOLD,1,CHBLK)","2","S","DISPLAYBASE","12420"
"M_ACCY","","","","S","",""
"M_COVR","","CS(DATCVR01)","1","S","OTHER","31040"
"M_CSCL","","CS(DATCVR01)","1","S","OTHER","31040"
"M_HOPA","","","","S","",""
"M_NPUB","","","","S","",""
"M_NSYS","","LC(MARSYS51)","4","S","STANDARD","27040"

"M_NSYS","MARSYS1\rORIENT\r","SY(DIRBOYA1,ORIENT);LS(DASH,1,CHGRD)","4","S","STANDARD","27040"
"M_NSYS","MARSYS2\rORIENT\r","SY(DIRBOYB1,ORIENT);LS(DASH,1,CHGRD)","4","S","STANDARD","27040"
"M_NSYS","ORIENT\r","SY(DIRBOY01,ORIENT);LS(DASH,1,CHGRD)","4","S","STANDARD","27040"
"M_QUAL","","AP(NODATA03);LS(DASH,2,CHGRD)","4","S","OTHER","31010"
"M_QUAL","CATZOC1\r","AP(DQUALA11);LS(DASH,2,CHGRD)","4","S","OTHER","31010"
"M_QUAL","CATZOC2\r","AP(DQUALA21);LS(DASH,2,CHGRD)","4","S","OTHER","31010"
"M_QUAL","CATZOC3\r","AP(DQUALB01);LS(DASH,2,CHGRD)","4","S","OTHER","31010"
"M_QUAL","CATZOC4\r","AP(DQUALC01);LS(DASH,2,CHGRD)","4","S","OTHER","31010"
"M_QUAL","CATZOC5\r","AP(DQUALD01);LS(DASH,2,CHGRD)","4","S","OTHER","31010"
"M_QUAL","CATZOC6\r","AP(DQUALU01);LS(DASH,2,CHGRD)","4","S","OTHER","31010"
"M_SDAT","","","","S","",""
"M_SREL","","","","S","",""
"M_VDAT","","","","S","",""
"MAGVAR","","SY(MAGVAR51)","4","S","OTHER","31080"
"MARCUL","","AP(MARCUL02);LS(DASH,1,CHGRD);CS(RESTRN01)","3","S","STANDARD","26210"
"MIPARE","","SY(CTYARE51);LS(DASH,2,CHMGD);CS(RESTRN01)","4","S","STANDARD","26040"
"MORFAC","","AC(CHBRN);LS(SOLD,1,CHBLK)","6","S","DISPLAYBASE","12410"
"OBSTRN","","CS(OBSTRN04)","4","S","OTHER","34050"
"OBSTRN","CATOBS6\r","CS(OBSTRN04;AP(FOULAR01);LS(DOTT,2,CHBLK)","4","S","OTHER","34050"
"OBSTRN","CATOBS7\r","SY(FOULGND1);LS(DASH,1,CHGRD)","4","S","OTHER","34050"
"OFSPLF","","AC(CHBRN);LS(SOLD,4,CSTLN);TE('Prod %s','OBJNAM',3,1,2,'15110',1,-1,CHBLK,21)","5","O","DISPLAYBASE","12210"
"OSPARE","","SY(CTYARE51);LS(DASH,2,CHMGD);CS(RESTRN01)","4","S","STANDARD","26040"
"PILBOP","","SY(PILBOP02);LS(DASH,2,TRFCF)","4","S","STANDARD","28010"
"PIPARE","","SY(INFARE51);LS(DASH,2,CHMGD);CS(RESTRN01)","3","S","STANDARD","26230"
"PIPARE","CATPIP2\r","SY(INFARE51);LS(DASH,2,CHGRD);CS(RESTRN01)","3","S","STANDARD","26230"
"PIPARE","CATPIP3\r","SY(INFARE51);LS(DASH,2,CHGRD);CS(RESTRN01)","3","S","STANDARD","26230"
"PIPARE","PRODCT3\r","SY(INFARE51);LS(DASH,2,CHGRD);CS(RESTRN01)","3","S","STANDARD","26230"
"PONTON","","AC(CHBRN);LS(SOLD,2,CSTLN)","5","S","DISPLAYBASE","12410"
"PRCARE","","SY(PRCARE51);LS(DASH,2,TRFCD);CS(RESTRN01)","4","S","DISPLAYBASE","15010"
"PRDARE","","LS(DASH,1,LANDF)","4","S","OTHER","32270"
"PRDARE","CATPRA5\rCONVIS1\r","SY(RFNERY11);LS(DASH,1,CHBLK)","4","S","STANDARD","22220"
"PRDARE","CATPRA8\rCONVIS1\r","SY(TNKFRM11);LS(DASH,1,CHBLK)","4","S","STANDARD","22220"
"PRDARE","CATPRA9\rCONVIS1\r","SY(WNDFRM61);LS(DASH,1,CHBLK)","4","S","STANDARD","22220"
"PRDARE","CATPRA1\r","SY(QUARRY01);LS(DASH,1,LANDF)","4","S","OTHER","32270"
"PRDARE","CATPRA5\r","SY(RFNERY01);LS(DASH,1,LANDF)","4","S","OTHER","32270"
"PRDARE","CATPRA6\r","SY(TMBYRD01);LS(DASH,1,LANDF)","4","S","OTHER","32270"
"PRDARE","CATPRA8\r","SY(TNKFRM01);LS(DASH,1,LANDF)","4","S","OTHER","32270"
"PRDARE","CATPRA9\r","SY(WNDFRM51);LS(DASH,1,LANDF)","4","S","OTHER","32270"
"PYLONS","","AC(CHBRN);LS(SOLD,2,CSTLN)","8","S","DISPLAYBASE","12210"
"RADRNG","","LS(DASH,1,TRFCF)","3","S","STANDARD","25040"
"RAPIDS","","AC(CHGRD)","3","S","OTHER","32050"
"RCTLPT","","SY(RTLDEF51)","4","S","DISPLAYBASE","15020"
"RCTLPT","ORIENT\r","SY(RCTLPT52,ORIENT)","4","S","DISPLAYBASE","15020"
"RECTRC","","SY(RECDEF51);LS(DASH,1,CHGRD)","6","S","STANDARD","25020"
"RECTRC","ORIENT\rCATTRK1\rTRAFIC1\r","SY(RECTRC58,ORIENT);TE('%03.0lf
deg','ORIENT',3,2,2,'15110',4,0,CHBLK,11);LS(DASH,1,CHGRD)","6","S","STANDARD","25020"
"RECTRC","ORIENT\rCATTRK1\rTRAFIC2\r","SY(RECTRC58,ORIENT);TE('%03.0lf
deg','ORIENT',3,2,2,'15110',4,0,CHBLK,11);LS(DASH,1,CHGRD)","6","S","STANDARD","25020"
"RECTRC","ORIENT\rCATTRK1\rTRAFIC3\r","SY(RECTRC58,ORIENT);TE('%03.0lf
deg','ORIENT',3,2,2,'15110',4,0,CHBLK,11);LS(DASH,1,CHGRD)","6","S","STANDARD","25020"
"RECTRC","ORIENT\rCATTRK1\rTRAFIC4\r","SY(RECTRC56,ORIENT);TE('%03.0lf
deg','ORIENT',3,2,2,'15110',4,0,CHBLK,11);LS(DASH,1,CHGRD)","6","S","STANDARD","25020"
"RECTRC","ORIENT\rCATTRK2\rTRAFIC1\r","SY(RECTRC57,ORIENT);TE('%03.0lf
deg','ORIENT',3,2,2,'15110',4,0,CHBLK,11);LS(DASH,1,CHGRD)","6","S","STANDARD","25020"
"RECTRC","ORIENT\rCATTRK2\rTRAFIC2\r","SY(RECTRC57,ORIENT);TE('%03.0lf
deg','ORIENT',3,2,2,'15110',4,0,CHBLK,11);LS(DASH,1,CHGRD)","6","S","STANDARD","25020"
"RECTRC","ORIENT\rCATTRK2\rTRAFIC3\r","SY(RECTRC57,ORIENT);TE('%03.0lf
deg','ORIENT',3,2,2,'15110',4,0,CHBLK,11);LS(DASH,1,CHGRD)","6","S","STANDARD","25020"
"RECTRC","ORIENT\rCATTRK2\rTRAFIC4\r","SY(RECTRC55,ORIENT);TE('%03.0lf
deg','ORIENT',3,2,2,'15110',4,0,CHBLK,11);LS(DASH,1,CHGRD)","6","S","STANDARD","25020"
"RECTRC","ORIENT\rTRAFIC1\r","SY(RECTRC57,ORIENT);TE('%03.0lf
deg','ORIENT',3,2,2,'15110',4,0,CHBLK,11);LS(DASH,1,CHGRD)","6","S","STANDARD","25020"
"RECTRC","ORIENT\rTRAFIC2\r","SY(RECTRC57,ORIENT);TE('%03.0lf
deg','ORIENT',3,2,2,'15110',4,0,CHBLK,11);LS(DASH,1,CHGRD)","6","S","STANDARD","25020"
"RECTRC","ORIENT\rTRAFIC3\r","SY(RECTRC57,ORIENT);TE('%03.0lf
deg','ORIENT',3,2,2,'15110',4,0,CHBLK,11);LS(DASH,1,CHGRD)","6","S","STANDARD","25020"
"RECTRC","ORIENT\rTRAFIC4\r","SY(RECTRC55,ORIENT);TE('%03.0lf
deg','ORIENT',3,2,2,'15110',4,0,CHBLK,11);LS(DASH,1,CHGRD)","6","S","STANDARD","25020"
"RESARE","","CS(RESARE02)","5","S","STANDARD","26010"
"RIVERS","","AC(DEPVS);LS(SOLD,1,CHBLK)","2","S","OTHER","32050"
"ROADWY","","AC(LANDA);LS(SOLD,1,LANDF)","4","S","OTHER","32250"
"RUNWAY","","AC(CHBRN)","5","S","OTHER","32240"
"RUNWAY","CONVIS1\r","AC(CHBRN);LS(SOLD,1,CHBLK)","5","S","STANDARD","22220"
"SBDARE","","","","S","",""
"SBDARE","WATLEV3\rNATSUR\r","TX(NATSUR,1,2,2,'15110',0,0,CHBLK,25);LS(DASH,1,CHGRD)","3","S","OTHER","34010"
"SBDARE","WATLEV4\rNATSUR9\r","AP(RCKLDG01);LS(DASH,1,CHGRD)","3","S","OTHER","34010"
"SBDARE","WATLEV4\rNATSUR11\r","AP(RCKLDG01);LS(DASH,1,CHGRD)","3","S","OTHER","34010"
"SBDARE","WATLEV4\rNATSUR14\r","AP(RCKLDG01);LS(DASH,1,CHGRD)","3","S","OTHER","34010"
"SBDARE","WATLEV4\rNATSUR\r","TX(NATSUR,1,2,2,'15110',0,0,CHBLK,25);LS(DASH,1,CHGRD)","3","S","OTHER","34010"
"SEAARE","","TX(OBJNAM,1,2,3,'15110',0,0,CHBLK,26)","3","S","STANDARD","21060"
"SILTNK","","AC(CHBRN);LS(SOLD,1,LANDF)","4","S","OTHER","32220"
"SILTNK","CONVIS1\r","AC(CHBRN);LS(SOLD,1,CHBLK)","4","S","STANDARD","22220"
"SLCONS","","CS(SLCONS03)","7","O","DISPLAYBASE","12410"
"SLOGRD","","","","S","",""
"SLOGRD","CATSLO6\r","AC(CHGRD)","3","S","OTHER","32010"

```
"SMCFAC","","AC(CHBRN);SY(SMCFAC02);LS(SOLD,1,LANDF)","4","S","OTHER","38210"
"SNDWAV","","AP(SNDWAV01);LS(DASH,2,CHGRD)","4","S","STANDARD","24010"
"SPLARE","","SY(CTYARE51);LS(DASH,1,CHMGD);CS(RESTRN01)","4","S","STANDARD","26040"
"SUBTLN","","SY(CTYARE51);LS(DASH,1,CHMGD);CS(RESTRN01)","4","S","STANDARD","26040"
"SWPARE","","SY(SWPARE51);TE('swept to %5.1lf','DRVAL1',1,2,2,'15110',0,1,CHBLK,27);LS(DASH,1,CHGRD)","4","S","STANDARD","23030"

"T_HMON","","SY(TIDEHT01);LS(DASH,1,CHGRD)","2","S","OTHER","33050"
"T_NHMN","","SY(TIDEHT01);LS(DASH,1,CHGRD)","2","S","OTHER","33050"
"T_TIMS","","SY(TIDEHT01);LS(DASH,1,CHGRD)","2","S","OTHER","33050"
"TS_FEB","","SY(CURDEF01);LS(DASH,1,CHGRD)","2","S","OTHER","33060"
"TS_FEB","CAT_TS1\r\nORIENT\r","SY(FLDSTR01,ORIENT);TE('%4.1lf kn','CURVEL',3,1,2,'15110',1,-1,CHBLK,31)","4","S","OTHER","33060"
"TS_FEB","CAT_TS2\r\nORIENT\r","SY(EBBSTR01,ORIENT);TE('%4.1lf kn','CURVEL',3,1,2,'15110',1,-1,CHBLK,31)","4","S","OTHER","33060"
"TS_FEB","CAT_TS3\r\nORIENT\r","SY(CURENT01,ORIENT);TE('%4.1lf kn','CURVEL',3,1,2,'15110',1,-1,CHBLK,31)","4","S","OTHER","33060"
"TS_PAD","","SY(TIDSTR01);LS(DASH,1,CHGRD)","2","S","OTHER","33060"
"TS_PNH","","SY(TIDSTR01);LS(DASH,1,CHGRD)","2","S","OTHER","33060"
"TS_PRH","","SY(TIDSTR01);LS(DASH,1,CHGRD)","2","S","OTHER","33060"
"TS_TIS","","SY(TIDSTR01);LS(DASH,1,CHGRD)","2","S","OTHER","33060"
"TESARE","","LS(DASH,2,CHGRF);CS(RESTRN01)","2","S","OTHER","36050"
"TIDEWY","","TX(OBJNAM,1,2,3,'15110',0,0,CHBLK,25)","7","S","OTHER","32070"
"TSEZNE","","AC(TRFCF,3)","4","S","DISPLAYBASE","15010"
"TSSCRS","","AP(TSSJCT02);SY(TSSCRS51);CS(RESTRN01)","6","S","DISPLAYBASE","15010"
"TSSLPT","","SY(CTNARE51);TX(INFORM,1,1,2,'15110',0,-2,CHBLK,24);CS(RESTRN01)","6","S","DISPLAYBASE","15010"
"TSSLPT","ORIENT\r","SY(TSSLPT51,ORIENT);CS(RESTRN01)","6","S","DISPLAYBASE","15010"
"TSSRON","","SY(TSSRON51);CS(RESTRN01)","6","S","DISPLAYBASE","15010"
"TUNNEL","","LS(DASH,1,CHGRD)","4","S","OTHER","32250"
"TUNNEL","BURDEP0\r","AC(DEPVS);LS(DASH,1,CHBLK)","4","S","STANDARD","24010"
"TWRTPT","","SY(TWRDEF51);LS(DASH,4,TRFCD)","4","S","DISPLAYBASE","15010"
"TWRTPT","ORIENT\rTRAFIC1\r","SY(TWRTPT53,ORIENT);LS(DASH,4,TRFCD)","4","S","DISPLAYBASE","15010"
"TWRTPT","ORIENT\rTRAFIC2\r","SY(TWRTPT53,ORIENT);LS(DASH,4,TRFCD)","4","S","DISPLAYBASE","15010"
"TWRTPT","ORIENT\rTRAFIC3\r","SY(TWRTPT53,ORIENT);LS(DASH,4,TRFCD)","4","S","DISPLAYBASE","15010"
"TWRTPT","ORIENT\rTRAFIC4\r","SY(TWRTPT52,ORIENT);LS(DASH,4,TRFCD)","4","S","DISPLAYBASE","15010"
"UNSARE","","AC(NODTA);AP(NODATA03);LS(SOLD,2,CHGRD)","0","S","DISPLAYBASE","11050"
"VEGATN","","","","S","",""
"VEGATN","CATVEG7\r","AP(VEGATN04);LS(DASH,1,LANDF)","3","S","OTHER","32030"
"VEGATN","CATVEG21\r","AP(VEGATN04);LS(DASH,1,LANDF)","3","S","OTHER","32030"
"VEGATN","CATVEG3\r","AP(VEGATN03);LS(DASH,1,LANDF)","3","S","OTHER","32030"
"VEGATN","CATVEG4\r","AP(VEGATN03);LS(DASH,1,LANDF)","3","S","OTHER","32030"
"VEGATN","CATVEG5\r","AP(VEGATN03);LS(DASH,1,LANDF)","3","S","OTHER","32030"
"VEGATN","CATVEG6\r","AP(VEGATN03);LS(DASH,1,LANDF)","3","S","OTHER","32030"
"VEGATN","CATVEG13\r","AP(VEGATN03);LS(DASH,1,LANDF)","3","S","OTHER","32030"
"VEGATN","CATVEG14\r","AP(VEGATN03);LS(DASH,1,LANDF)","3","S","OTHER","32030"
"VEGATN","CATVEG15\r","AP(VEGATN03);LS(DASH,1,LANDF)","3","S","OTHER","32030"
"VEGATN","CATVEG16\r","AP(VEGATN03);LS(DASH,1,LANDF)","3","S","OTHER","32030"
"VEGATN","CATVEG17\r","AP(VEGATN03);LS(DASH,1,LANDF)","3","S","OTHER","32030"
"VEGATN","CATVEG18\r","AP(VEGATN03);LS(DASH,1,LANDF)","3","S","OTHER","32030"
"VEGATN","CATVEG19\r","AP(VEGATN03);LS(DASH,1,LANDF)","3","S","OTHER","32030"
"VEGATN","CATVEG20\r","AP(VEGATN03);LS(DASH,1,LANDF)","3","S","OTHER","32030"
"VEGATN","CATVEG22\r","AP(VEGATN03);LS(DASH,1,LANDF)","3","S","OTHER","32030"
"WATTUR","","SY(WATTUR02);LS(DASH,1,CHGRD)","4","S","OTHER","33040"
"WEDKLP","","SY(WEDKLP03);LS(DASH,1,CHGRF)","3","O","OTHER","34020"
"WRECKS","","CS(WRECKS02)","4","S","OTHER","34050"
"WRECKS","CATWRK3\r","LS(DASH,1,CHBLK)","4","S","OTHER","34050"
*
* ***                                ***
* *** section two: NON-STANDARD CLASSES ***
* ***                                ***
*
*Note: category "DISPLAYBASE" should not be removed from the display.
*For non-standard classes, all category "MARINERS STANDARD" and "MARINERS OTHER"
*should be drawn when "STANDARD DISPLAY" is drawn, and therefore may be re-assigned
*to the category of choosen by the mariner.
*
"dnghlt","","AC(DNGHL,3);LS(SOLD,3,DNGHL)","8","O","MARINERS STANDARD","53010"
"marfea","","AC(ADINF,3);TX(OBJNAM,1,2,3,'15110',0,0,CHBLK,50);LS(SOLD,2,NINFO);LS(SOLD,1,CHBLK);","8","S","MARINERS STANDARD","53050"
"mnufea","","LS(DASH,2,ADINF)","5","S","MARINERS STANDARD","55010"
*
* ***                    ***
* *** end of look-up table ***
* ***                    ***
```

# 12. SYMBOLOGY PROCEDURE DIAGRAMS

## 12.1 Introduction

### 12.1.1 General

The following pages present program flow charts and narrative descriptions explaining all conditional symbology procedures which have been developed so far. The flow charts are styled according to Nassi & Shneiderman Diagrams (8).

Since the flow charts have been carefully compiled to achieve a safe presentation of objects, manufacturers are advised to follow the programming instructions closely. But, as everybody knows, such procedures add extra complexity to the ECDIS software which in turn can jeopardize the safety of navigation. Therefore, please study the logic of each conditional symbology procedure carefully and report on ambiguities when necessary.

Please also note, that until a symbology language has been developed, conditional symbology procedures cannot be provided in machine readable form and consequently they cannot be automatically updated. For the time being conditional symbology procedures must be programmed by the ECDIS manufacturer on his own. In case changes may be necessary for these built-in procedures ECDIS manufacturers should provide a proprietary update methodology for their software.

Some of the flow charts describe the presentation of mariners' navigational objects. Please see S-52 / Appendix 2 / Annex A / Part 2 for further details and definitions of the mariners' navigational object classes.

### 12.1.2 List of Procedures

The following flow charts and narrative descriptions of conditional symbology procedures are presented:

| | | | |
|---|---|---|---|
| (12.2.1) | Clearing line (mariners' navigational object) | | CLRLIN01 |
| (12.2.2) | Data coverage, scale boundaries, overscale (S-57) | * | DATCVR01 |
| (12.2.3) | Depth area colour fill and dredged area pattern fill (S-57) | | DEPARE01 |
| (12.2.4) | Depth contours, including safety contour (S-57) | | DEPCNT02 |
| (12.2.5) | Depth value (S-57) | | DEPVAL01 |
| (12.2.6) | Leg of planned route (mariners' navigational object) | | LEGLIN02 |
| (12.2.7) | Light flares, light sectors & light coverage (S-57) | | LIGHTS05 |
| (12.2.8) | Light description text string (S-57) | | LITDSN01 |
| (12.2.9) | Obstructions and rocks (S-57) | | OBSTRN04 |
| (12.2.10) | Own ship (mariners' navigational object) | * | OWNSHP02 |
| (12.2.11) | Past track (mariners' navigational object) | | PASTRK01 |
| (12.2.12) | Quality (accuracy) of position (S-57) | | QUAPOS01 |
| (12.2.13) | Quality of position of line objects (S-57) | | QUALIN01 |
| (12.2.14) | Quality of position of point and area objects (S-57) | | QUAPNT01 |

| | | |
|---|---|---|
| (12.2.15) | Quality of position of shoreline constructions | SLCONS03 |
| (12.2.16) | Restricted areas - object class RESARE (S-57) | RESARE02 |
| (12.2.17) | Entry procedure for restrictions (S-57) | RESTRN01 |
| (12.2.18) | Restrictions - attribute RESTRN (S-57) | RESCSP01 |
| (12.2.19) | Colour fill for depth areas (S-57) | SEABED01 |
| (12.2.20) | Entry procedure for symbolizing soundings (S-57) | SOUNDG02 |
| (12.2.21) | Symbolizing soundings, including safety depth (S-57) | SNDFRM02 |
| (12.2.22) | Topmarks (S-57) | TOPMAR01 |
| (12.2.23) | Isolated dangers in general that endanger own ship (S-57) | UDWHAZ03 |
| (12.2.24) | Vessel other than own ship (mariners' navigational object) | * VESSEL01 |
| (12.2.25) | Symbolizing VRMs and EBLs (mariners' navigational object) | * VRMEBL01 |
| (12.2.26) | Wrecks (S-57) | WRECKS02 |

* Pocedures marked by an asterisk are in narrative form.

### 12.1.3 Mariners' selections

The following global parameters carrying mariners' selections are used by the procedures:

| | | |
|---|---|---|
| SAFETY_DEPTH | - | selected safety depth (meters) [IMO PS 3.7] |
| SHALLOW_CONTOUR | - | selected shallow water contour (meters) (optional) |
| SAFETY_CONTOUR | - | selected safety contour (meters) [IMO PS 3.6] |
| DEEP_CONTOUR | - | selected deep water contour (meters) (optional) |
| TWO_SHADES | - | flag indicating selection of two depth shades (on/off) |
| SHALLOW_PATTERN | - | flag indicating selection of shallow water highlight (on/off) (optional) |
| SHIPS_OUTLINE | - | flag indicating selection of ship's scale symbol (on/off ) [IMO PS 8.4] |
| DISTANCE_TAGS | - | selected spacing of "distance to run" tags at a route (nm) |
| TIME_TAGS | - | selected spacing of time tags at the pasttrack (min) |
| FULL_SECTORS | - | show full length light sector lines |

Please also see 8.3.5 for further information how conditional symbology procedures handle display priority, OVERRADAR flag and display category .

### 12.1.4 Notes on flow charts:

A box completely separated from an enclosing box indocates a sub-procedure which is to be called at this point.

A box spearated from the enclosing box only on the top and left sides indicates a repeating loop.

### 12.1.5 Shared sub-procedures

Some basic procedures are used in more than one application. For example, SNDFRM02 is called by soundings, wrecks, rocks and obstructions to compose depth values into soundings.

Such shared sub-procedures can only be accessed through a calling procedure; they cannot be called directly from the look-up table. When necessary, an entry procedure is set up solely to give this access; e.g., RESTRN01 is used to give access to shared procedure RESCSP01.

The following table illustrates these relationships:

| Object | CSP | Sub-Procedure | |
|---|---|---|---|
| *M_COVR(a)*<br>*M_CSCL(a)* | **DATCVR01** | | |
| *DEPARE(a)*<br>*DRGARE(a)* | **DEPARE01** | ***RESCSP01***<br>***SEABED01*** | *Note: this sub-procedure also called by* **RESTRN01** |
| *DEPARE(l)*<br>*DEPCNT(l)* | **DEPCNT02** | | |
| *LIGHTS(p)* | **LIGHTS05** | ***LITDSN01*** | |
| *OBSTRN(pla)*<br><br>*UWTROC(p)* | **OBSTRN04** | ***DEPVAL01***<br>***QUAPNT01***<br>***SNDFRM02***<br>***UDWHAZ03*** | *Note: this sub-procedure also called by* **WRECKS02**<br>*Note: this sub-procedure also called by* **QUAPOS01** & **WRECKS02**<br>*Note: this sub-procedure also called by* **SOUNDG02** & **WRECKS02**<br>*Note: this sub-procedure also called by* **WRECKS02** |
| *LNDARE(pl)* | **QUAPOS01** | ***QUAPNT01*** | *Note: this sub-procedure also called by* **OBSTRN04** & **WRECKS02** |
| *COALNE(l)* | **QUAPOS01** | ***QUALIN01*** | |
| *RESARE(a)* | **RESARE02** | | *Note: this procedure includes the effect of* RESTRN |
| *ACHARE(a)*<br>*CBLARE(a)*<br>*DMPGRD(a)*<br>*DWRTPT(a)*<br>*FAIRWY(a)*<br>*ICNARE(a)*<br>*ISTZNE(a)*<br>*MARCUL(a)*<br>*MIPARE(a)*<br>*OSPARE(a)* | **RESTRN01** | ***RESCSP01*** | *Note: this sub-procedure also called by* **DEPARE01** |

| | | | |
|---|---|---|---|
| *PIPARE(a)* | | | |
| *PRCARE(a)* | | | |
| *SPLARE(a)* | | | |
| *SUBTLN(a)* | | | |
| *TESARE(a)* | | | |
| *TSSCRS(a)* | | | |
| *TSSLPT(a)* | | | |
| *TSSRON(a)* | | | |

| | | | |
|---|---|---|---|
| *SLCONS(pla)* | **SLCONS03** | | |

| | | | |
|---|---|---|---|
| *SOUNDG(p)* | **SOUNDG02** | ***SNDFRM02*** | *Note: this sub-procedure also called by* **OBSTRN04** & **WRECKS02** |

| | | | |
|---|---|---|---|
| *TOPMAR(p)* | **TOPMAR01** | | |

| | | | |
|---|---|---|---|
| *WRECKS(pa)* | **WRECKS02** | ***DEPVAL01*** | *Note: this sub-procedure also called by* **OBSTRN04** |
| | | ***QUAPNT01*** | *Note: this sub-procedure also called by* **QUAPOS01** & **OBSTRN04** |
| | | ***SNDFRM02*** | *Note: this sub-procedure also called by* **OBSTRN04** & **SOUNDG02** |
| | | ***UDWHAZ03*** | *Note: this sub-procedure also called by* **OBSTRN04** |

### 12.2.1 Conditional Symbology Procedure 'CLRLIN01'

Applies to: Mariners' Navigational Object Class "mariners' clearing line" (clrlin)

Spatial Object(s): Line

Attribute(s) used: "category of mariners' clearing line" (catclr)

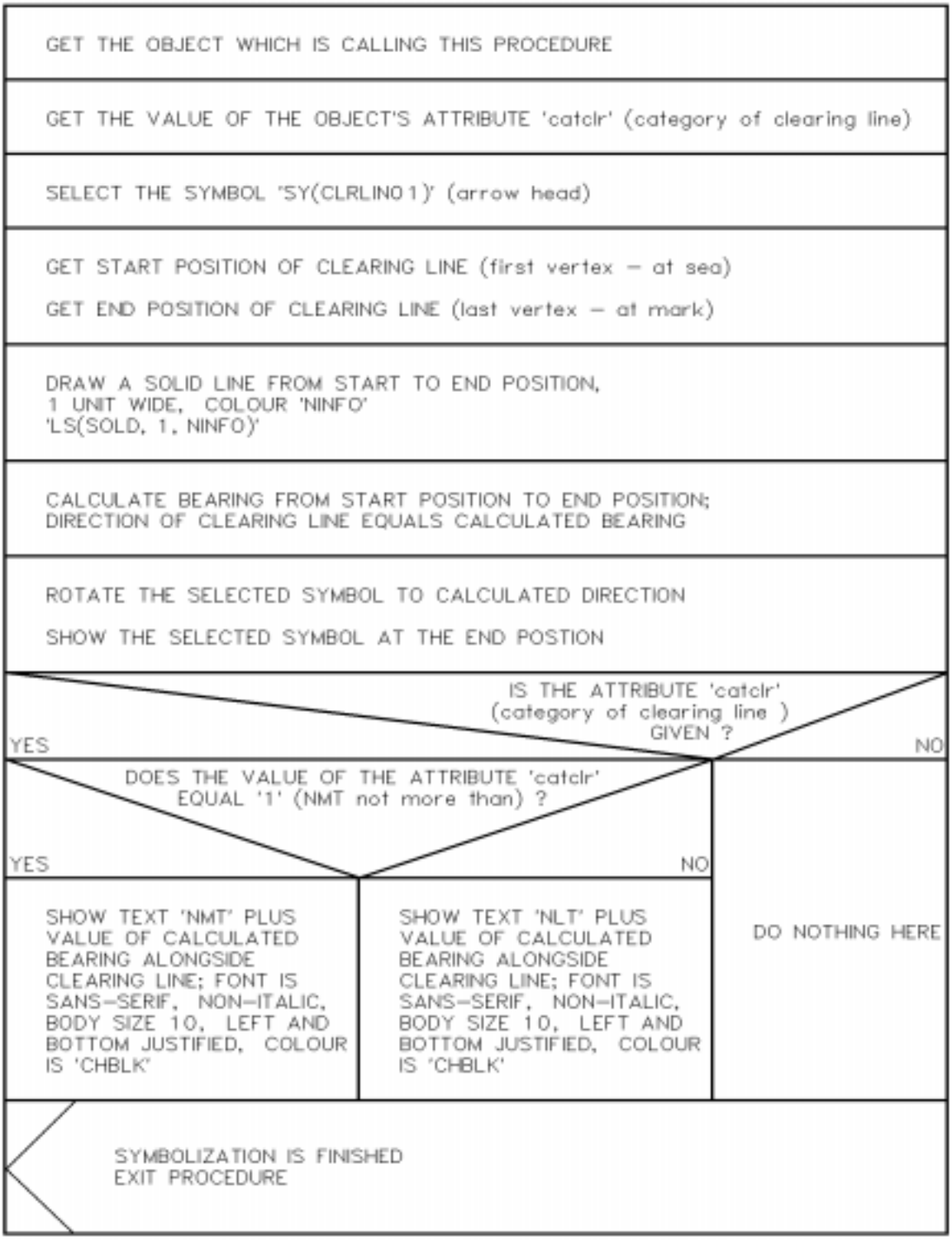
Parameter(s): Object to be symbolized from SENC

Defaults: Display Priority given by look-up table
OVERRADAR priority given by look-up table
Display Category given by look-up table
Viewing Group given by look-up table

Remarks: A clearing line shows a single arrow head at one of its ends. The direction of the clearing line must be calculated from its line object in order to rotate the arrow head symbol and place it at the correct end. This cannot be achieved with a complex linestyle since linestyle symbols cannot be sized to the length of the clearing line. Instead a linestyle with a repeating pattern of arrow symbols had to be used which does not comply with the required symbolization.

# CLRLIN01

Conditional symbology procedure for symbolization of objects of the class 'clrlin' (mariner's clearing line).



### 12.2.2 Conditional Symbology Procedure 'DATCVR01'

| | |
|---|---|
| Applies to: | Entire contents of the ENC |
| Spatial Objects(s): | Point, Line, Area |
| Attribute(s) & data fields used | Data coverage (M_COVR, CATCVR)<br>Catalogue directory field (CATD)<br><br>Compilation scale (M_CSCL, CSCALE)Data set parameter field, compilation scale (DSPM, CSCL)<br><br>Data set identification field, intended usage (navigational purpose) (DSID, INTU) |
| Parameter(s): | Requirements in IMO and IHO standards and specifications |
| Defaults: | Symbolize "No ENC data" |
| Remarks: | This conditional symbology procedure describes procedures for:<br>- symbolizing the limit of ENC coverage;<br>- symbolizing navigational purpose boundaries («scale boundaries»); and<br>- indicating overscale display.<br><br>Note that the mandatory meta object CATQUA is symbolized by the look-up table.<br><br>Because the methods adopted by an ECDIS to meet the IMO and IHO requirements listed on the next page will depend on the manufacturer's software, and cannot be described in terms of a flow chart in the same way as other conditional procedures, this procedure is in the form of written notes. |

**DATCVR01**

Procedures for:
- symbolizing the limits of ENC coverage,
- symbolizing navigational-purpose boundaries, (chart scale boundaries),
- indicating overscale display.

1. REQUIREMENTS

IMO Performance standards A 19/Res.817:

5.1 An indication is required if the display is at a larger scale than that of the ENC (see 4.1 below).

5.2 An indication is required if larger scale data than that shown on the display is available (see 4.3 below).

App. 2, line 2.8. Chart scale boundaries are part of the standard display (see 3.1 below)

IHO Specifications for ECDIS chart content and display S-52:

3.4a An indication "refer to the paper chart" is required if the display includes waters for which no ENC at appropriate scale exists (see 2.1 below).

3.5c If a scale boundary is shown on the display, the information in an overscale area should be identified, and should not be relied on (see 4.2 below).

6.3d A graphical index of the navigational purpose of available data should be shown on demand (see 3.2 below).

## 2. ENC COVERAGE

S-57 app. B1 - "ENC Product Specification", section 2.2, describes the cell system and the use of object class M_COVR to indicate data coverage. Note that a value of M_COVR, CATCVR=2 does not necessarily indicate "no data", since data could be contained in an overlapping cell.

### 2.1 Limit of ENC coverage.

Since the HO will not issue a data coverage diagram, the ECDIS should compile one. The boundary of the combined adjacent areas of M_COVR, CATCVR=1, which defines the limit of the ENC, should be symbolised on the ECDIS display by linestyle LC (HODATA01). The display priority is 3; over-radar; display base; viewing group 11060. Note that the LC (HODATA01) is a "one-sided" line and the boundary of the ENC must be drawn according to S-57 rules in order to ensure that diagonal stroke of the line is on the ENC data side of the line.

### 2.2 No data areas:

To make sure that the mariner is aware of areas where no data exist, the entire screen should always be filled with grey NODTA colour fill together with the fill pattern NODATA03 at the start, before any other information is drawn. The display priority is 0 (allowing non-ENC data to be overdrawn); radar flag suppressed by radar; the category is DISPLAYBASE and the viewing group is 11050.

An indication that the mariner must refer to the paper chart should be given whenever line LC(HODATA01) appears on the display, or whenever the display is comprised of other than ENC data.

## 3. SCALE BOUNDARIES

"Navigational purpose" is used in S-57 to express the concept of scale (ENC Product Specification 2.1). The scales that comprise each navigation purpose are defined by the HO, as explained in S-57.

### 3.1 Chart scale boundaries.

The "chart scale boundaries", where the navigational purpose of the data changes, should be symbolised on the ECDIS display by a simple linestyle LS(SOLD,1,CHGRD). Alternatively linestyle LC(SCLBDYnn) may be used, with the double line (indicating better resolution) on the side of the larger scale data. The display priority is 3; over-radar; standard display; viewing group 21030.

Only the significant changes from one navigational purpose to another should appear as chart scale boundaries; boundaries marking minor changes in compilation scale that lie within the range of a navigational purpose should not be drawn.

3.2 Graphical index of navigational purpose.

The chart catalogue for paper charts may be used as a model for the graphical index of navigational purpose, except that minor changes in compilation scale that lie within the range of a navigational purpose should not be drawn on this index. Only the significant changes from one navigational purpose to another should appear.

## 4. OVERSCALE

Scale is expressed as a fraction, representing: [length of an object on the chart] / [actual length of that object on the ground]. Thus 1/10,000 is twice as large a scale as 1/20,000, because the length of a given object on the chart is twice as long at 1/10,000 scale as at 1/20,000.

The "Compilation Scale" is the reference for overscale calculation. This is coded in the CSCL subfield of the DSPM field. The object M_CSCL, CSCALE is only used if the compilation scale is different for some part of the data set. (S-57 App. B1, Ann. A - "Use of the Object Catalogue").

4.1 Overscale indication.

The overscale indication is intended to remind the mariner that the size of chart errors is magnified when he increases the display scale. A 1 mm error at compilation scale of 1/20,000 becomes a 1.3 mm error at a display scale of 1/15,000 and a 2 mm error at 1/10,000.

The overscale factor should be calculated as [denominator of the compilation scale] / denominator of the display scale], expressed as, for example "X1.3", or "X2" (using the figures in the example above). This should be indicated on the same screen as the chart display, and treated as display base. Use colour SCLBR.

4.2 Overscale area at a chart scale boundary.

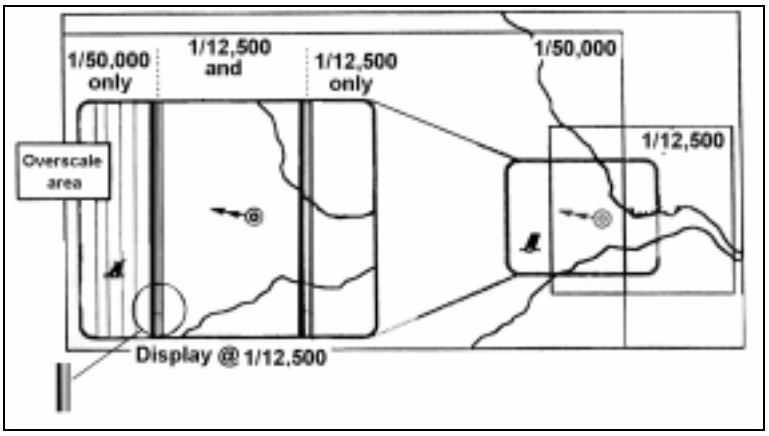
Section 4.1 above dealt with overscale deliberately selected by the mariner. A different overscale situation arises when the ship approaches a scale boundary from a larger to a smaller scale ENC, typically when leaving harbour, as illustrated in figure 7. In combining data from the large scale and the small scale ENCs to generate a display at the larger scale, the ECDIS will have grossly enlarged the small scale data to the left of the scale boundary on this figure.

In addition to drawing the scale boundaries, the grossly overscale part of the display should be identified with pattern AP(OVERSC01), as illustrated. Its display priority is 3; over-radar; standard display; viewing group 21030.

4.3 Larger scale data available.

Visualise the opposite situation from that on figure 7. This time, the ship is approaching harbour from the left edge of the figure, displaying an ENC at a compilation scale of 1/50,000. As the display window begins to cover an ENC at a compilation scale of 1/12,500, the ECDIS should indicate that larger scale data will shortly become available.

Fig. 7 - Data Coverage

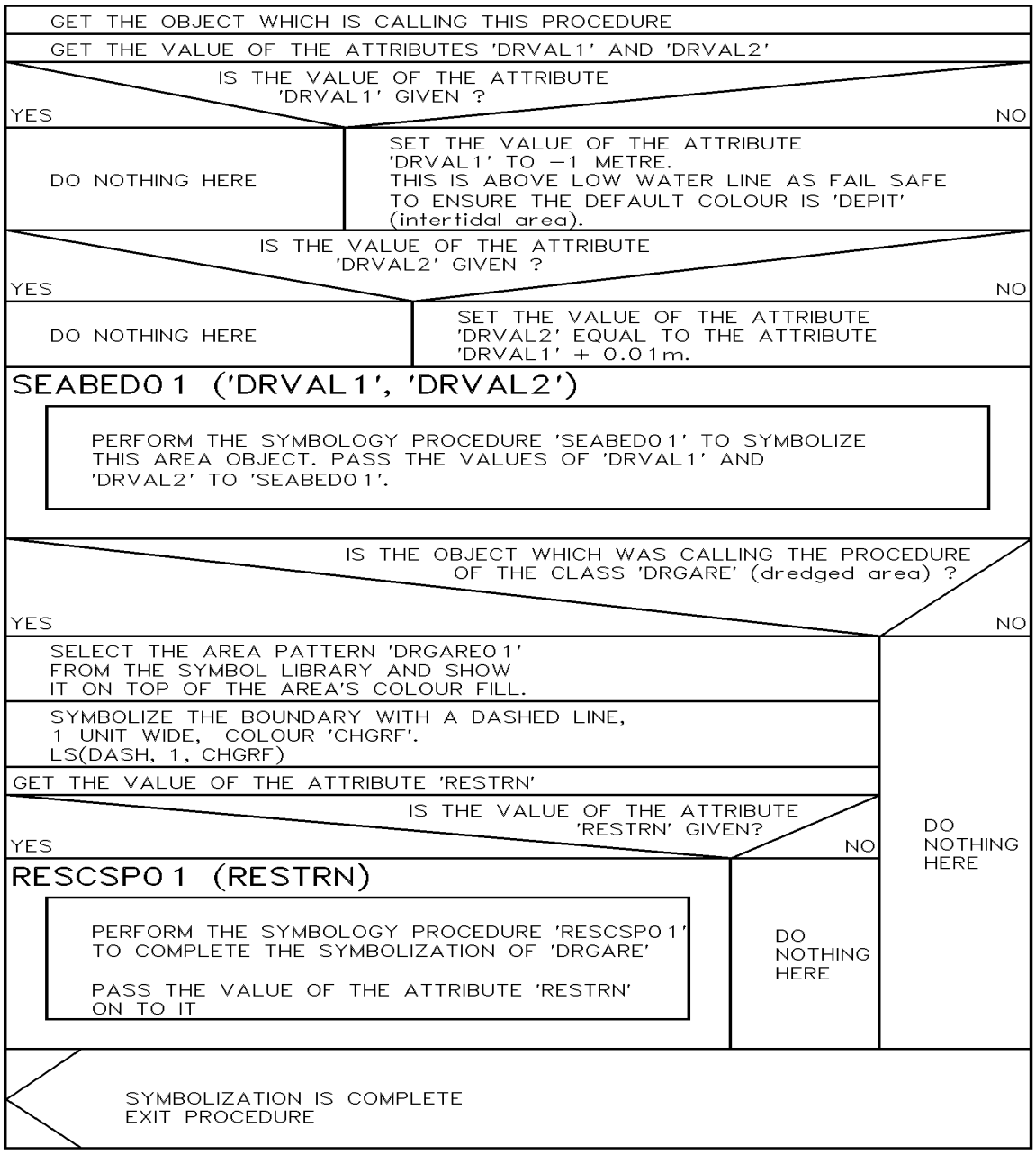



### 12.2.3 Conditional Symbology Procedure 'DEPARE01'

| | |
|---|---|
| Applies to: | S-57 Object Class "depth area" (DEPARE) as an area, not as a line<br>S-57 Object Class "dredged area" (DRGARE) |
| Spatial Object(s): | Area |
| Attribute(s) used: | "depth range value 1" (DRVAL1)<br>"depth range value 2" (DRVAL2) |
| Parameter(s): | Object to be symbolized from SENC |
| Defaults: | Display Priority given by look-up table<br>OVERRADAR priority given by look-up table<br>Display Category given by look-up table<br>Viewing Group given by look-up table |
| Remarks: | An object of the class "depth area" is coloured and covered with fill patterns according to the mariners selections of shallow contour, safety contour and deep contour. This requires a decision making process provided by the sub-procedure "SEABED01" which is called by this symbology procedure. Objects of the class "dredged area" are handled by this routine as well to ensure a consistent symbolization of areas that represent the surface of the seabed. |

# DEPAREO 1

Conditional symbology procedure for symbolization of objects of the classes 'DEPARE' (Depth Area) and 'DRGARE' (DREDGED AREA)



### 12.2.4 Conditional Symbology Procedure 'DEPCNT02'

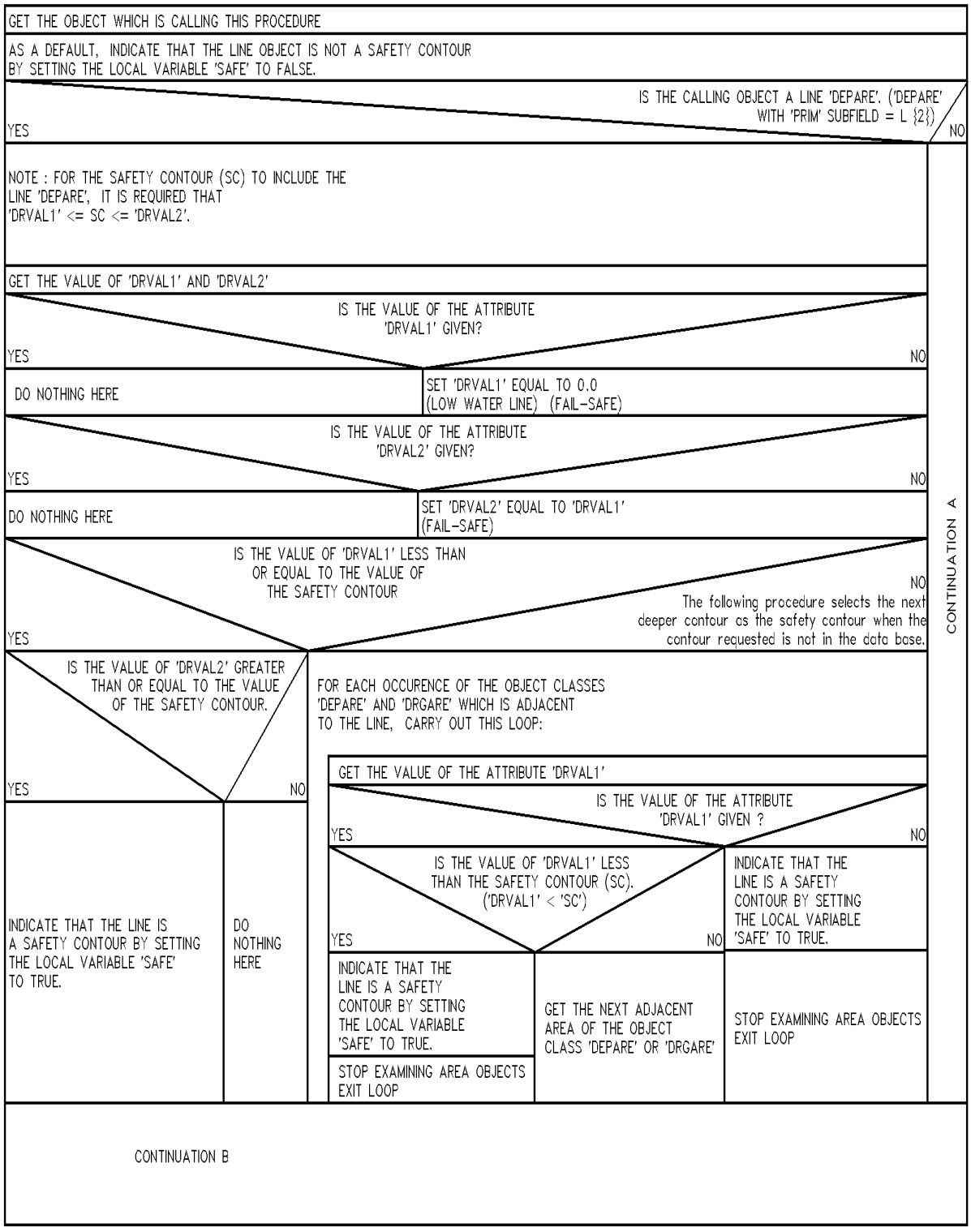
| | |
|---|---|
| Applies to: | S-57 Object Class "depth contour" (DEPCNT)<br>S-57 Object Class «depth area» (DEPARE) as a line |
| Spatial Object(s): | Line |
| Relation(s) used: | adjacency of depth areas |
| Attribute(s) used: | "value of depth contour" (VALDCO)<br>«depth range value» (DRVAL1, DRVAL2) |
| Parameter(s): | Object to be symbolized from SENC<br>SAFETY_CONTOUR depth value entered by the mariner |
| Defaults: | Display Priority given by look-up table<br>OVERRADAR priority given by look-up table<br>Display Category given by look-up table<br>Viewing Group given by look-up table |
| Required ECDIS startup values: | The manufacturer is responsible for setting SAFETY_CONTOUR to 30 metres (see also conditional symbology procedure "DEPARE01"). This value should stay in operation until the mariner decides to select another safety contour. |

Remarks: An object of the class "depth contour" or «line depth area» is highlighted and must be shown under all circumstances if it matches the safety contour depth value entered by the mariner (see IMO PS 3.6). But, while the mariner is free to enter any safety contour depth value that he thinks is suitable for the safety of his ship, the SENC only contains a limited choice of depth contours. This symbology procedure determines whether a contour matches the selected safety contour. If the selected safety contour does not exist in the data, the procedure will default to the next deeper contour. The contour selected is highlighted as the safety contour and put in DISPLAYBASE. The procedure also identifies any line segment of the spatial component of the object that has a 'QUAPOS' value indicating unreliable positioning, and symbolizes it with a double dashed line.

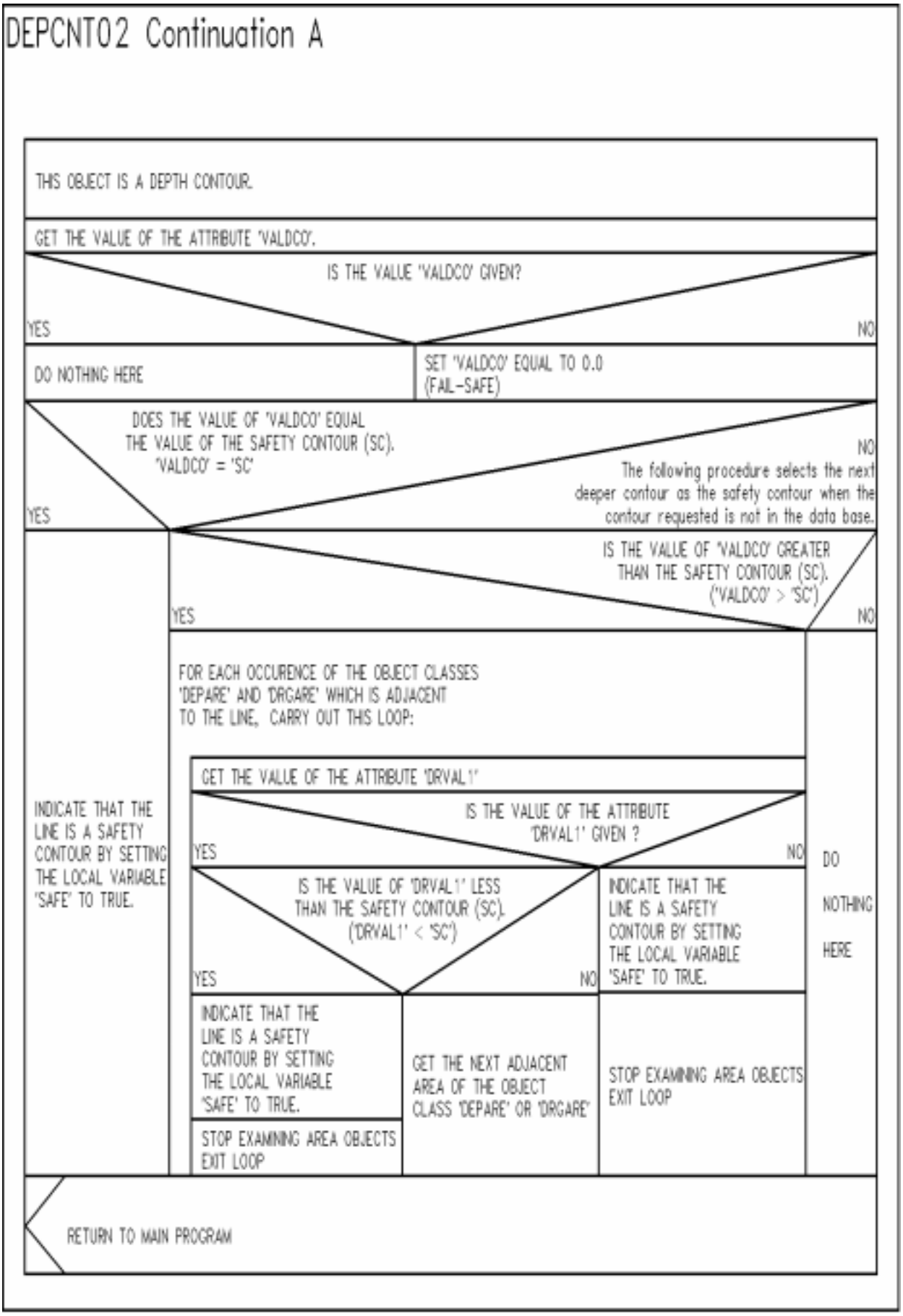
Note: Depth contours are not normally labeled. The ECDIS may provide labels, on demand only as with other text, or provide the depth value on cursor picking

# DEPCNT02

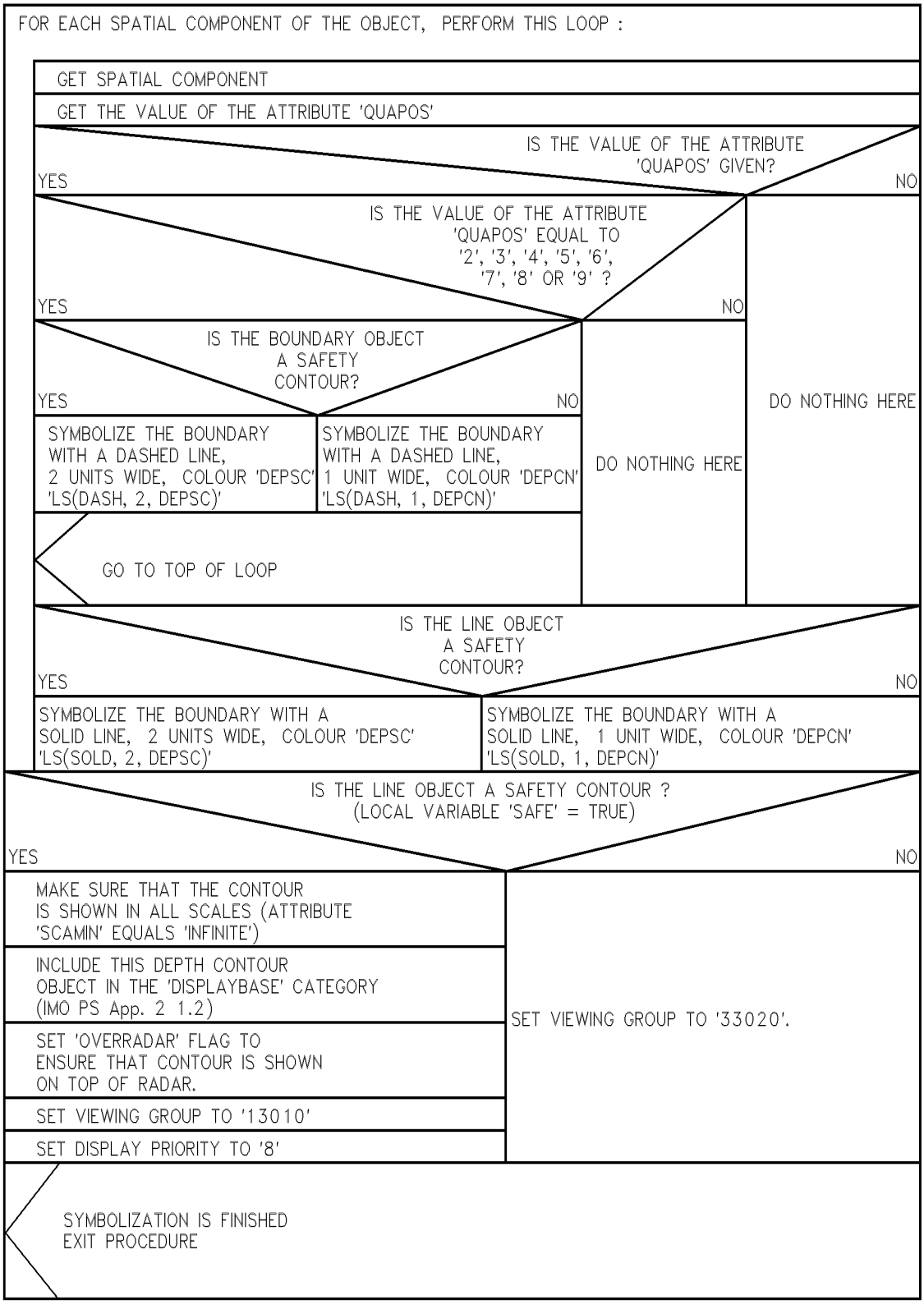
Conditional symbology procedure for symbolizing objects of the class depth contour (DEPCNT) and line depth areas (DEPARE as a line ).



# DEPCNT02 Continuation A



# DEPCNT02 Continuation B



### 12.2.5 Conditional Symbology Procedure 'DEPVAL01'

( Note that this is a sub-procedure called by OBSTRN04 and WRECKS02)

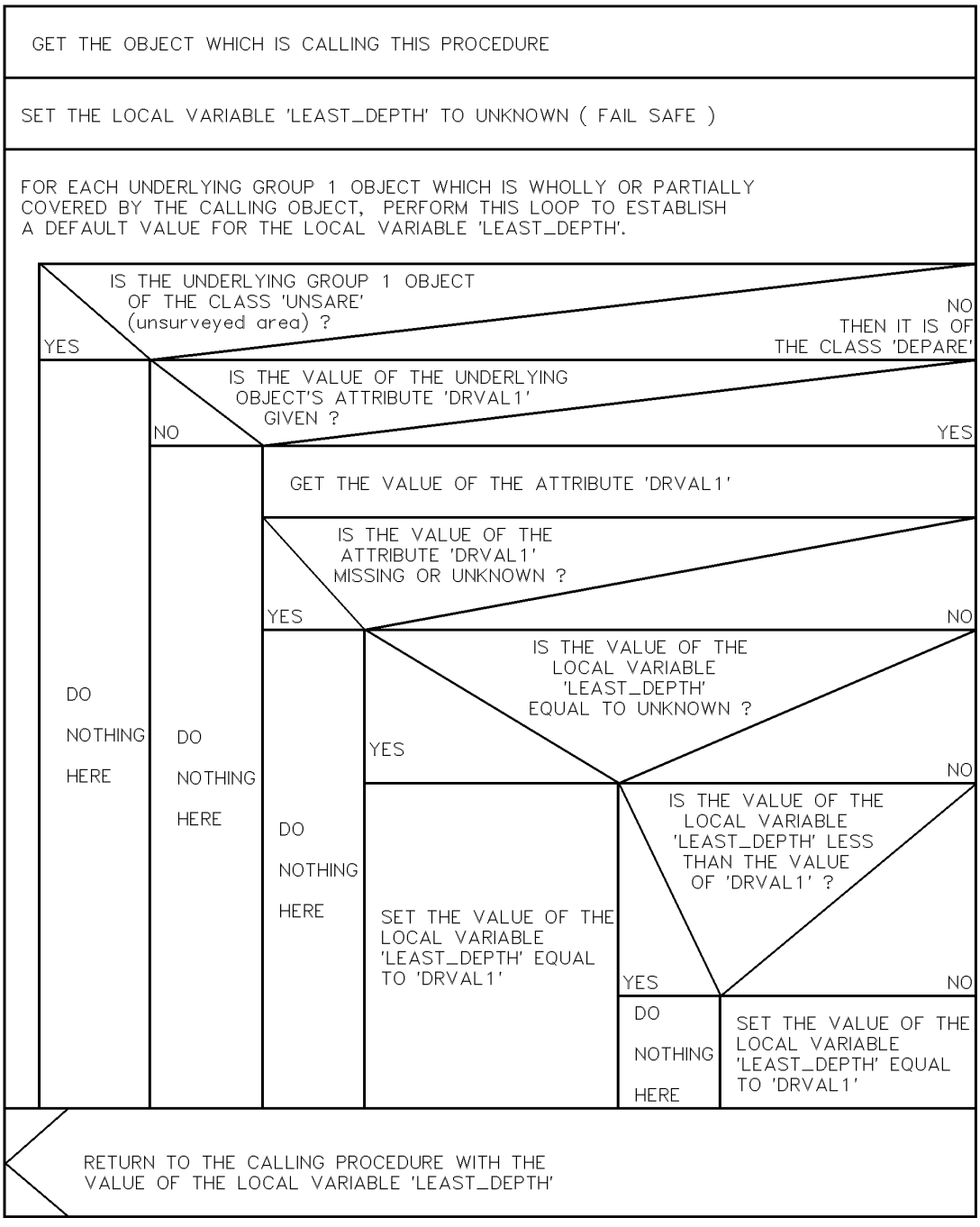
| | |
|---|---|
| Applies to: | All underwater hazards of type area. |
| Spatial Object(s): | Area |
| Relation(s) used: | common parts of overlapping area objects |
| Attribute(s) used: | «depth range value» DRVAL1 |
| Parameter(s): | Object to be symbolized from SENC<br>Underlying DEPARE or UNSARE objects |
| Defaults: | Return to main program for defaults |
| Remarks: | S-57 Appendix B1 Annex A requires in Section 6 that areas of rocks be encoded as area obstruction, and that area OBSTRNs and area WRECKS be covered by either group 1 object DEPARE or group 1 object UNSARE.<br><br>If the value of the attribute VALSOU for an area OBSTRN or WRECKS is missing, the DRVAL1 of an underlying DEPARE is the preferred default for establishing a depth vale. This procedure either finds the shallowest DRVAL1 of the one or more underlying DEPAREs, or returns an «unknown» depth value to the main procedure for the next default procedure. |

# DEPVAL01

Conditional symbology procedure to establish a more precise value for the depth value of an aerea OBSTRN or WRECKS from the underlying group 1 area.

Please note, that this procedure is called by other procedures ( obstructions and wrecks ) which handle the symbolization of obstructions on the seabed.

The procedure returns a local variable 'LEAST_DEPTH'.



### 12.2.6 Conditional Symbology Procedure 'LEGLIN02'

| | |
|---|---|
| Applies to: | Mariners' Navigational Object Class "Leg" (leglin) |
| Spatial Object(s): | Line |
| Attribute(s) used: | "selection" (select)<br>"planned speed" (plnspd) |
| Parameter(s): | Object to be symbolized from SENC<br>DISTANCE_TAGS value selected by the mariner |
| Defaults: | Display Priority given by look-up table<br>OVERRADAR priority given by look-up table<br>Display Category given by look-up table<br>Viewing Group given by look-up table |
| Remarks: | The course of a leg is given by its start and end point. Therefore this conditional symbology procedure calculates the course and shows it alongside the leg. It also places the "distance to run" labels and cares for the different presentation of planned & alternate legs. |

# LEGLIN02

Conditional symbology procedure for symbolization of objects of the class 'leglin' (leg).

GET THE OBJECT WHICH IS CALLING THIS PROCEDURE

GET THE VALUE OF THE OBJECT'S ATTRIBUTE 'select' (selection)

DOES THE VALUE OF THE ATTRIBUTE 'select' EQUAL '1' (planned)? (IMO PS 10.4.3/10.5.10)

| YES | NO |
|---|---|
| SELECT COLOUR 'PLRTE' | SELECT COLOUR 'APLRT' |
| SELECT SYMBOL 'SY(PLNSPD03)' | SELECT SYMBOL 'SY(PLNSPD04)' |
| SYMBOLIZE THE LEG WITH THE COMPLEX LINESTYLE 'LC(PLNRTE03)' | SYMBOLIZE THE LEG WITH A DOTTED LINE, 2 UNITS WIDE, COLOUR 'APLRT' 'LS(DOTT, 2, APLRT)' |
| SET VIEWING CATEGORY TO 'DISPLAYBASE' | SET VIEWING CATEGORY TO 'STANDARD' |
| SET VIEWING GROUP TO '42210' | SET VIEWING GROUP TO '52210' |

GET START POSITION OF LEG (first vertex)
GET END POSITION OF LEG (last vertex)

CALCULATE BEARING FROM START POSITION TO END POSITION
DIRECTION OF LEG EQUALS COURSE TO MAKE GOOD

SHOW COURSE TO MAKE GOOD AS TEXT, PADDED WITH ZEROES, WITH SUFFIX ''deg'', ALONGSIDE LEG;
FONT IS SANS-SERIF, NON-ITALIC, BODY SIZE 12, LEFT AND BOTTOM JUSTIFIED, USE COLOUR 'CHBLK'

Continuation A

# LEGLIN02 Continuation A

### 12.2.7 Conditional Symbology Procedure 'LIGHTS05'

| | |
|---|---|
| Applies to: | S-57 Object Class "light" (LIGHTS) |
| Spatial Object(s): | Point |
| Relation(s) used: | Point objects at identical location |
| Attribute(s) used: | "colour" (COLOUR)<br>"category of light" (CATLIT)<br>"sector 1" (SECTR1)<br>"sector 2" (SECTR2)<br>«orientation» (ORIENT)<br>"visibility of light" (LITVIS)<br>"value of nominal range" (VALNMR) |
| Parameter(s): | Object to be symbolized from SENC |
| Defaults: | Display Priority given by look-up table<br>OVERRADAR priority given by look-up table<br>Display Category given by look-up table<br>Viewing Group given by look-up table |
| Remarks: | A light is one of the most complex S-57 objects. Its presentation depends on whether it is a light on a floating or fixed platform, its range, it's colour and so on. This conditional symbology procedure derives the correct presentation from these parameters and also generates an area that shows the coverage of the light. |

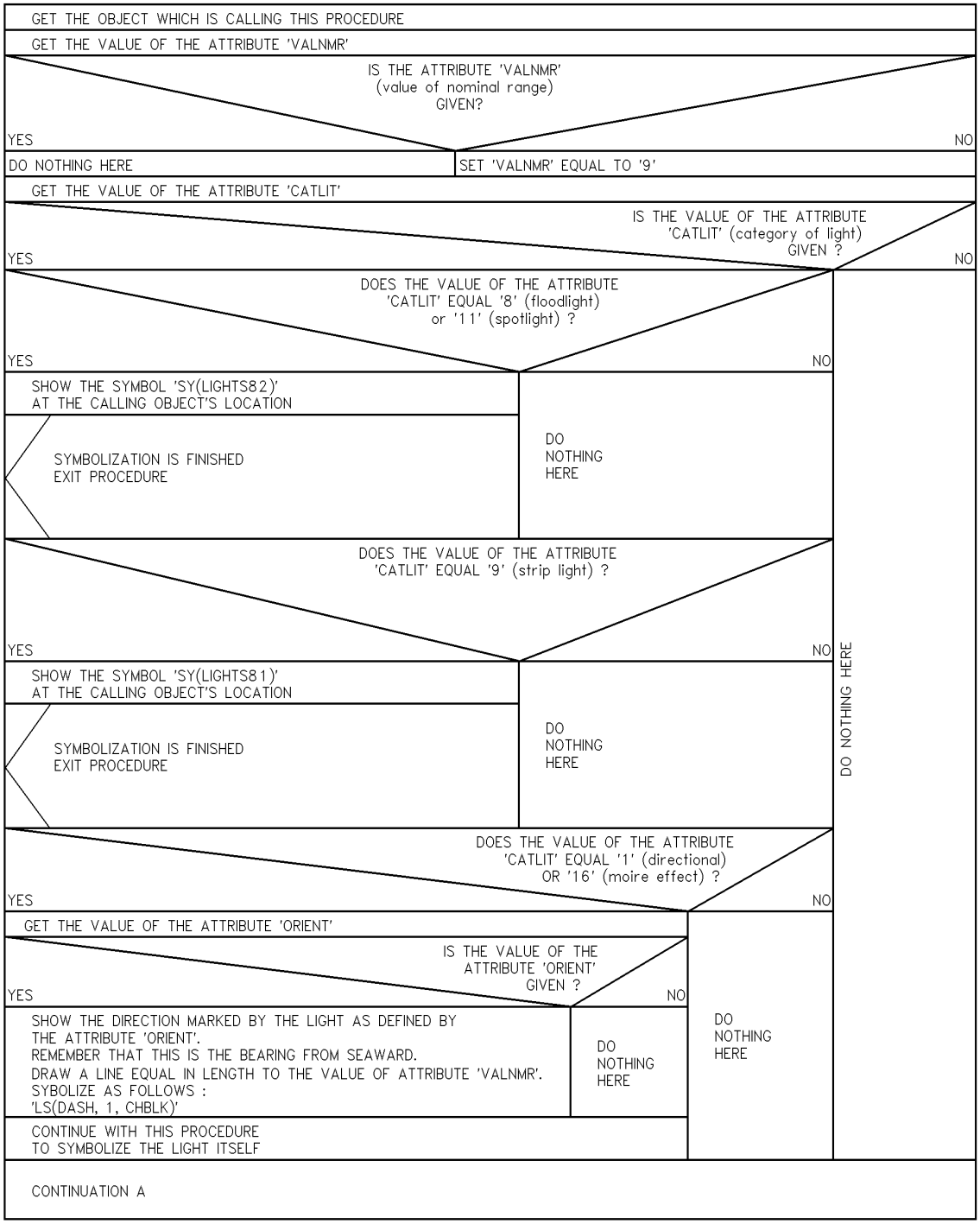
Notes on light sectors:

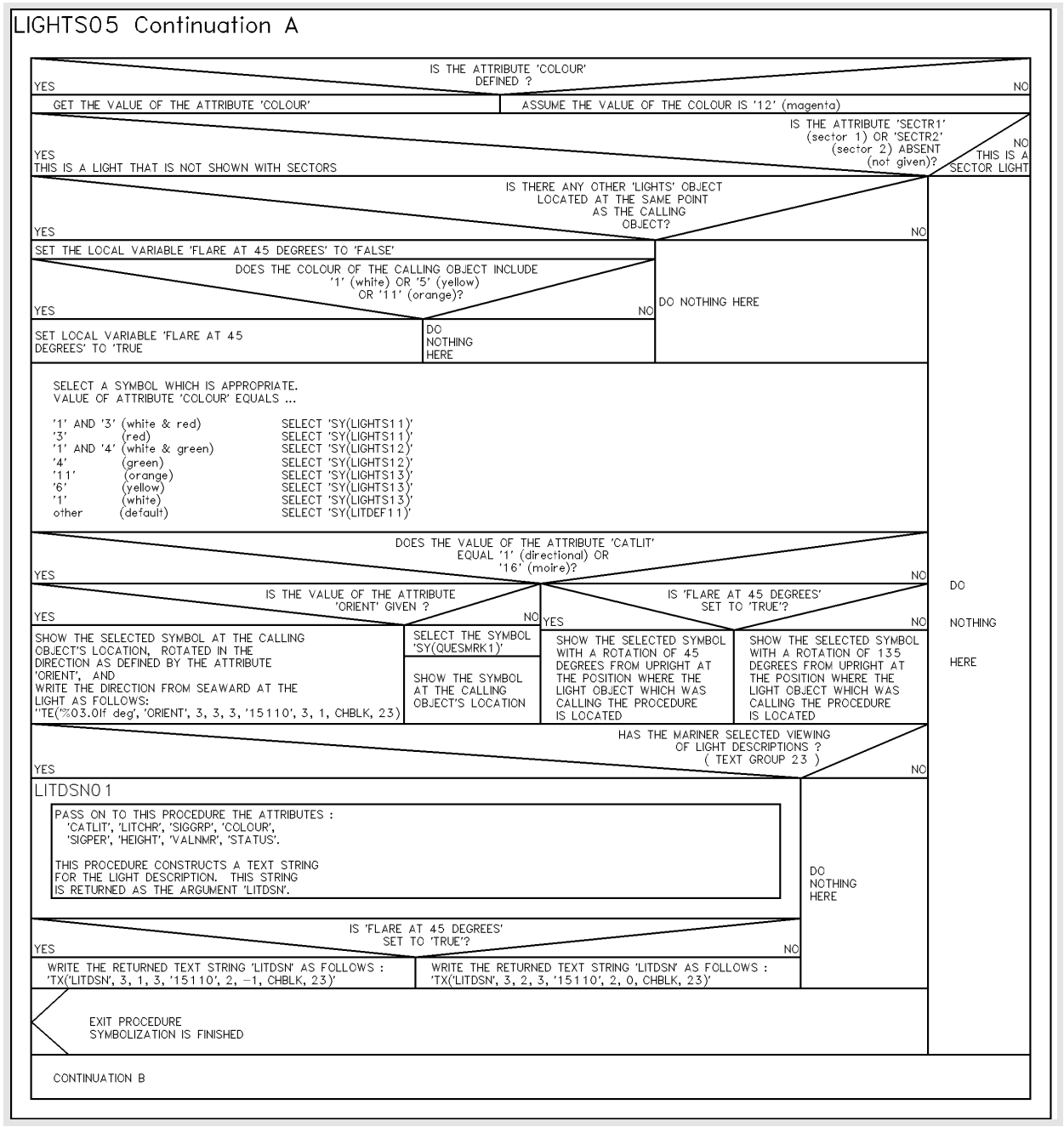
1.) The radial leg-lines defining the light sectors are normally drawn to only 25mm from the light to avoid clutter (see Part C). However, the mariner should be able to select «full light-sector lines» and have the leg-lines extended to the nominal range of the light (VALMAR).

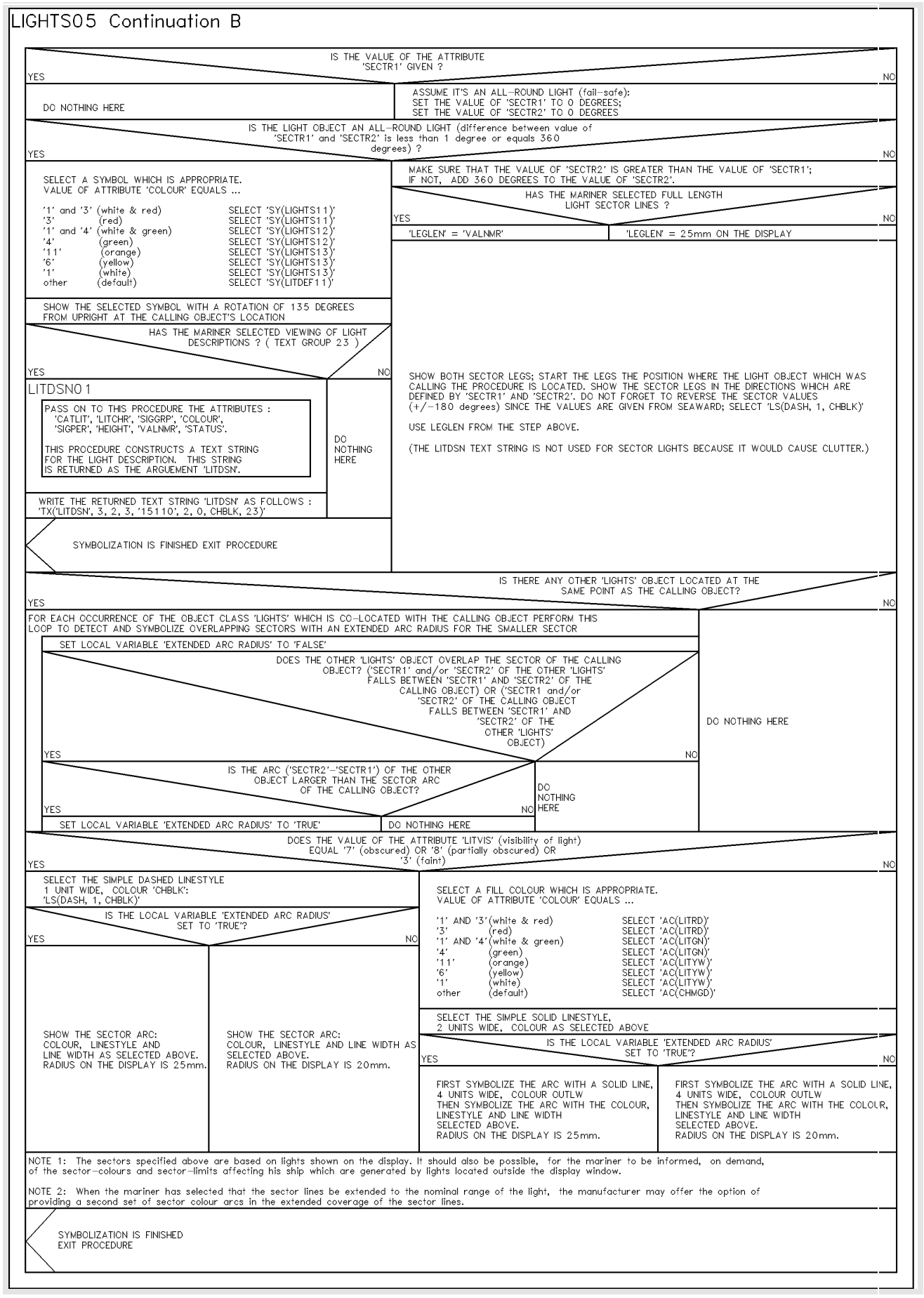
2.) Part C of this procedure symbolizes the sectors at the light itself. **In addition, it should be possible, upon request, for the mariner to be capable of identifying the colour and sector limit lines of the sectors affecting the ship even if the light itself is off the display.**

# LIGHTS05

Conditional symbology procedure for symbolization of objects of the class 'lights'.




LIGHTS05 Continuation A
IS THE ATTRIBUTE 'COLOUR' DEFINED ?
YES
NO
GET THE VALUE OF THE ATTRIBUTE 'COLOUR'
ASSUME THE VALUE OF THE COLOUR IS '12' (magenta)
IS THE ATTRIBUTE 'SECTR1' (sector 1) OR 'SECTR2' (sector 2) ABSENT (not given)?
YES
THIS IS A LIGHT THAT IS NOT SHOWN WITH SECTORS
NO
THIS IS A SECTOR LIGHT
IS THERE ANY OTHER 'LIGHTS' OBJECT LOCATED AT THE SAME POINT AS THE CALLING OBJECT?
YES
NO
SET THE LOCAL VARIABLE 'FLARE AT 45 DEGREES' TO 'FALSE'
DOES THE COLOUR OF THE CALLING OBJECT INCLUDE '1' (white) OR '5' (yellow) OR '11' (orange)?
YES
NO
DO NOTHING HERE
SET LOCAL VARIABLE 'FLARE AT 45 DEGREES' TO 'TRUE
DO NOTHING HERE
SELECT A SYMBOL WHICH IS APPROPRIATE.
VALUE OF ATTRIBUTE 'COLOUR' EQUALS ...
'1' AND '3' (white & red) SELECT 'SY(LIGHTS11)'
'3' (red) SELECT 'SY(LIGHTS11)'
'1' AND '4' (white & green) SELECT 'SY(LIGHTS12)'
'4' (green) SELECT 'SY(LIGHTS12)'
'11' (orange) SELECT 'SY(LIGHTS13)'
'6' (yellow) SELECT 'SY(LIGHTS13)'
'1' (white) SELECT 'SY(LIGHTS13)'
other (default) SELECT 'SY(LITDEF11)'
DOES THE VALUE OF THE ATTRIBUTE 'CATLIT' EQUAL '1' (directional) OR '16' (moire)?
YES
NO
IS THE VALUE OF THE ATTRIBUTE 'ORIENT' GIVEN ?
YES
NO
IS 'FLARE AT 45 DEGREES' SET TO 'TRUE'?
YES
NO
DO NOTHING HERE
SHOW THE SELECTED SYMBOL AT THE CALLING OBJECT'S LOCATION, ROTATED IN THE DIRECTION AS DEFINED BY THE ATTRIBUTE 'ORIENT', AND
WRITE THE DIRECTION FROM SEAWARD AT THE LIGHT AS FOLLOWS:
''TE('%03.0lf deg', 'ORIENT', 3, 3, 3, '15110', 3, 1, CHBLK, 23)
SELECT THE SYMBOL 'SY(QUESMRK1)'
SHOW THE SYMBOL AT THE CALLING OBJECT'S LOCATION
SHOW THE SELECTED SYMBOL WITH A ROTATION OF 45 DEGREES FROM UPRIGHT AT THE POSITION WHERE THE LIGHT OBJECT WHICH WAS CALLING THE PROCEDURE IS LOCATED
SHOW THE SELECTED SYMBOL WITH A ROTATION OF 135 DEGREES FROM UPRIGHT AT THE POSITION WHERE THE LIGHT OBJECT WHICH WAS CALLING THE PROCEDURE IS LOCATED
HAS THE MARINER SELECTED VIEWING OF LIGHT DESCRIPTIONS ? ( TEXT GROUP 23 )
YES
NO
LITDSN01
PASS ON TO THIS PROCEDURE THE ATTRIBUTES :
'CATLIT', 'LITCHR', 'SIGGRP', 'COLOUR', 'SIGPER', 'HEIGHT', 'VALNMR', 'STATUS'.
THIS PROCEDURE CONSTRUCTS A TEXT STRING FOR THE LIGHT DESCRIPTION. THIS STRING IS RETURNED AS THE ARGUMENT 'LITDSN'.
DO NOTHING HERE
IS 'FLARE AT 45 DEGREES' SET TO 'TRUE'?
YES
NO
WRITE THE RETURNED TEXT STRING 'LITDSN' AS FOLLOWS : 'TX('LITDSN', 3, 1, 3, '15110', 2, −1, CHBLK, 23)'
WRITE THE RETURNED TEXT STRING 'LITDSN' AS FOLLOWS : 'TX('LITDSN', 3, 2, 3, '15110', 2, 0, CHBLK, 23)'
EXIT PROCEDURE
SYMBOLIZATION IS FINISHED
CONTINUATION B


LIGHTS05 Continuation B
IS THE VALUE OF THE ATTRIBUTE 'SECTR1' GIVEN ?
YES
NO
DO NOTHING HERE
ASSUME IT'S AN ALL-ROUND LIGHT (fail-safe):
SET THE VALUE OF 'SECTR1' TO 0 DEGREES;
SET THE VALUE OF 'SECTR2' TO 0 DEGREES
IS THE LIGHT OBJECT AN ALL-ROUND LIGHT (difference between value of 'SECTR1' and 'SECTR2' is less than 1 degree or equals 360 degrees) ?
YES
NO
SELECT A SYMBOL WHICH IS APPROPRIATE.
VALUE OF ATTRIBUTE 'COLOUR' EQUALS ...
'1' and '3' (white & red) SELECT 'SY(LIGHTS11)'
'3' (red) SELECT 'SY(LIGHTS11)'
'1' and '4' (white & green) SELECT 'SY(LIGHTS12)'
'4' (green) SELECT 'SY(LIGHTS12)'
'11' (orange) SELECT 'SY(LIGHTS13)'
'6' (yellow) SELECT 'SY(LIGHTS13)'
'1' (white) SELECT 'SY(LIGHTS13)'
other (default) SELECT 'SY(LITDEF11)'
SHOW THE SELECTED SYMBOL WITH A ROTATION OF 135 DEGREES FROM UPRIGHT AT THE CALLING OBJECT'S LOCATION
HAS THE MARINER SELECTED VIEWING OF LIGHT DESCRIPTIONS ? ( TEXT GROUP 23 )
YES
NO
LITDSN01
PASS ON TO THIS PROCEDURE THE ATTRIBUTES : 'CATLIT', 'LITCHR', 'SIGGRP', 'COLOUR', 'SIGPER', 'HEIGHT', 'VALNMR', 'STATUS'.
THIS PROCEDURE CONSTRUCTS A TEXT STRING FOR THE LIGHT DESCRIPTION. THIS STRING IS RETURNED AS THE ARGUEMENT 'LITDSN'.
DO NOTHING HERE
WRITE THE RETURNED TEXT STRING 'LITDSN' AS FOLLOWS : 'TX('LITDSN', 3, 2, 3, '15110', 2, 0, CHBLK, 23)'
SYMBOLIZATION IS FINISHED EXIT PROCEDURE
MAKE SURE THAT THE VALUE OF 'SECTR2' IS GREATER THAN THE VALUE OF 'SECTR1'; IF NOT, ADD 360 DEGREES TO THE VALUE OF 'SECTR2'.
HAS THE MARINER SELECTED FULL LENGTH LIGHT SECTOR LINES ?
YES
NO
'LEGLEN' = 'VALNMR'
'LEGLEN' = 25mm ON THE DISPLAY
SHOW BOTH SECTOR LEGS; START THE LEGS THE POSITION WHERE THE LIGHT OBJECT WHICH WAS CALLING THE PROCEDURE IS LOCATED. SHOW THE SECTOR LEGS IN THE DIRECTIONS WHICH ARE DEFINED BY 'SECTR1' AND 'SECTR2'. DO NOT FORGET TO REVERSE THE SECTOR VALUES (+/-180 degrees) SINCE THE VALUES ARE GIVEN FROM SEAWARD; SELECT 'LS(DASH, 1, CHBLK)'
USE LEGLEN FROM THE STEP ABOVE.
(THE LITDSN TEXT STRING IS NOT USED FOR SECTOR LIGHTS BECAUSE IT WOULD CAUSE CLUTTER.)
IS THERE ANY OTHER 'LIGHTS' OBJECT LOCATED AT THE SAME POINT AS THE CALLING OBJECT?
YES
NO
FOR EACH OCCURRENCE OF THE OBJECT CLASS 'LIGHTS' WHICH IS CO-LOCATED WITH THE CALLING OBJECT PERFORM THIS LOOP TO DETECT AND SYMBOLIZE OVERLAPPING SECTORS WITH AN EXTENDED ARC RADIUS FOR THE SMALLER SECTOR
SET LOCAL VARIABLE 'EXTENDED ARC RADIUS' TO 'FALSE'
DOES THE OTHER 'LIGHTS' OBJECT OVERLAP THE SECTOR OF THE CALLING OBJECT? ('SECTR1' and/or 'SECTR2' OF THE OTHER 'LIGHTS' FALLS BETWEEN 'SECTR1' AND 'SECTR2' OF THE CALLING OBJECT) OR ('SECTR1 and/or 'SECTR2' OF THE CALLING OBJECT FALLS BETWEEN 'SECTR1' AND 'SECTR2' OF THE OTHER 'LIGHTS' OBJECT)
YES
NO
DO NOTHING HERE
IS THE ARC ('SECTR2'-'SECTR1') OF THE OTHER OBJECT LARGER THAN THE SECTOR ARC OF THE CALLING OBJECT?
YES
NO
DO NOTHING HERE
SET LOCAL VARIABLE 'EXTENDED ARC RADIUS' TO 'TRUE'
DO NOTHING HERE
DOES THE VALUE OF THE ATTRIBUTE 'LITVIS' (visibility of light) EQUAL '7' (obscured) OR '8' (partially obscured) OR '3' (faint)
YES
NO
SELECT THE SIMPLE DASHED LINESTYLE 1 UNIT WIDE, COLOUR 'CHBLK': 'LS(DASH, 1, CHBLK)'
IS THE LOCAL VARIABLE 'EXTENDED ARC RADIUS' SET TO 'TRUE'?
YES
NO
SHOW THE SECTOR ARC: COLOUR, LINESTYLE AND LINE WIDTH AS SELECTED ABOVE. RADIUS ON THE DISPLAY IS 25mm.
SHOW THE SECTOR ARC: COLOUR, LINESTYLE AND LINE WIDTH AS SELECTED ABOVE. RADIUS ON THE DISPLAY IS 20mm.
SELECT A FILL COLOUR WHICH IS APPROPRIATE.
VALUE OF ATTRIBUTE 'COLOUR' EQUALS ...
'1' AND '3' (white & red) SELECT 'AC(LITRD)'
'3' (red) SELECT 'AC(LITRD)'
'1' AND '4' (white & green) SELECT 'AC(LITGN)'
'4' (green) SELECT 'AC(LITGN)'
'11' (orange) SELECT 'AC(LITYW)'
'6' (yellow) SELECT 'AC(LITYW)'
'1' (white) SELECT 'AC(LITYW)'
other (default) SELECT 'AC(CHMGD)'
SELECT THE SIMPLE SOLID LINESTYLE, 2 UNITS WIDE, COLOUR AS SELECTED ABOVE
IS THE LOCAL VARIABLE 'EXTENDED ARC RADIUS' SET TO 'TRUE'?
YES
NO
FIRST SYMBOLIZE THE ARC WITH A SOLID LINE, 4 UNITS WIDE, COLOUR OUTLW THEN SYMBOLIZE THE ARC WITH THE COLOUR, LINESTYLE AND LINE WIDTH SELECTED ABOVE. RADIUS ON THE DISPLAY IS 25mm.
FIRST SYMBOLIZE THE ARC WITH A SOLID LINE, 4 UNITS WIDE, COLOUR OUTLW THEN SYMBOLIZE THE ARC WITH THE COLOUR, LINESTYLE AND LINE WIDTH SELECTED ABOVE. RADIUS ON THE DISPLAY IS 20mm.
NOTE 1: The sectors specified above are based on lights shown on the display. It should also be possible, for the mariner to be informed, on demand, of the sector-colours and sector-limits affecting his ship which are generated by lights located outside the display window.
NOTE 2: When the mariner has selected that the sector lines be extended to the nominal range of the light, the manufacturer may offer the option of providing a second set of sector colour arcs in the extended coverage of the sector lines.
SYMBOLIZATION IS FINISHED EXIT PROCEDURE

### 12.2.8 Conditional Symbology Procedure 'LITDSN01'

( Note that this is a sub-procedure called by LIGHTS05)

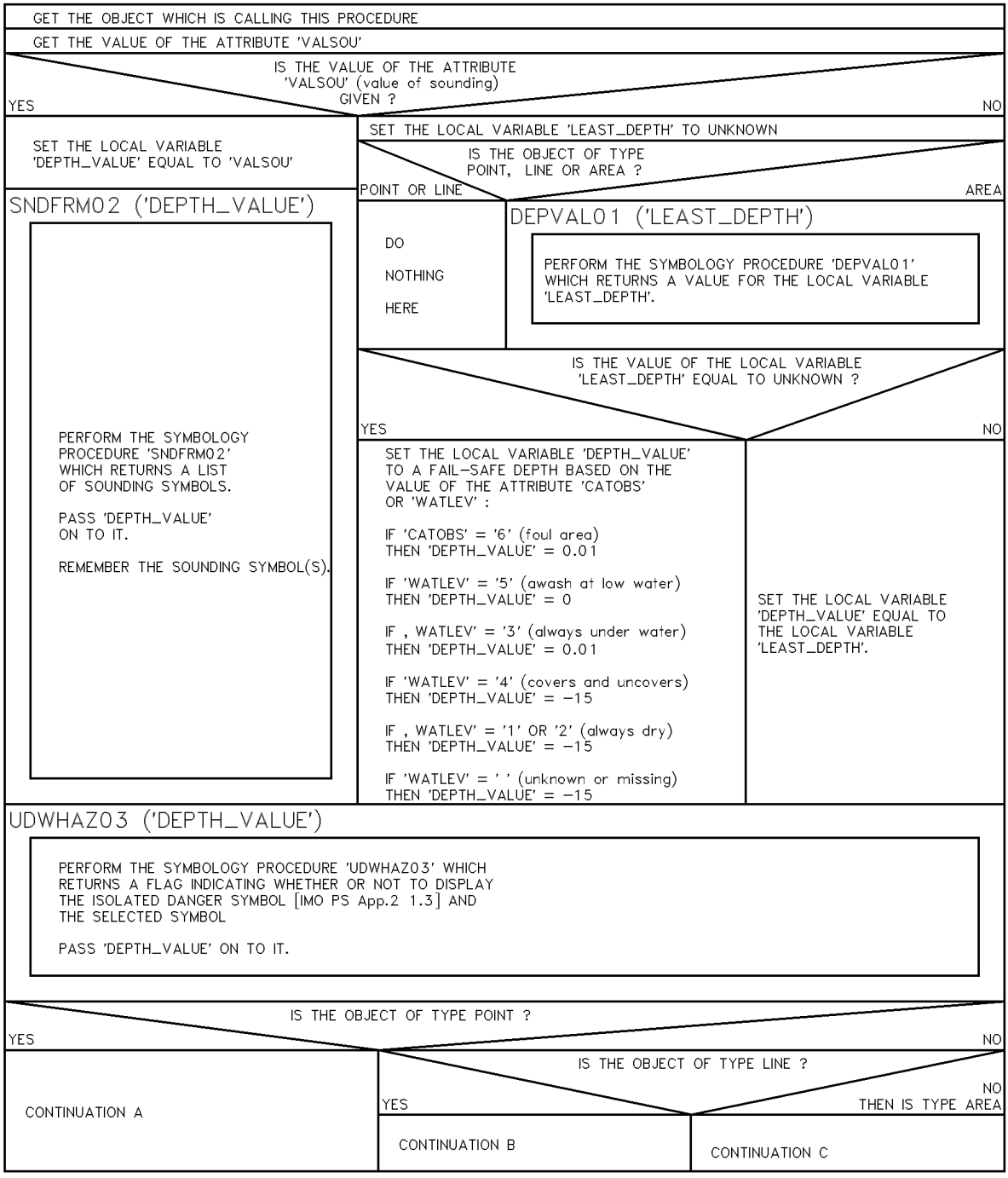
| | |
|---|---|
| Applies to: | S-57 Object Class «lights» (LIGHTS) |
| Spatial Object(s): | Point |
| Attributes used: | CATLIT, COLOUR, HEIGHT, LITCHR, SIGGRP, SIGPER, STATUS, VALNMR |
| Parameters: | Object to be symbolized from SENC |
| Defaults: | |
| Remarks: | In S-57 the light characteristics are held as a series of attributes values. The mariner may wish to see a light description text string displayed on the screen similar to the string commonly found on a paper chart. This conditional procedure, reads the attribute values from the above list of attributes and composes a light description string which can be displayed.<br><br>This procedure is provided as a C function which has as input, the above listed attribute values and as output, the light description. |

### 12.2.9 Conditional Symbology Procedure 'OBSTRN04'

| | |
|---|---|
| Applies to: | S-57 Object Class "obstruction" (OBSTRN)<br><br>S-57 Object Class "under water rock" (UWTROC) |
| Spatial Object(s): | Point, Area, Line |
| Attribute(s) used: | "value of sounding" (VALSOU)<br>«water level» (WATLEV) |
| Parameter(s): | Object to be symbolized from SENC |
| Defaults: | Display Priority given by look-up table<br>OVERRADAR priority given by look-up table<br>Display Category given by look-up table<br>Viewing Group given by look-up table<br>Area Color fill from underlying 'DEPARE' or 'UNSARE' |
| Remarks: | Obstructions or isolated underwater dangers of depths less than the safety contour which lie within the safe waters defined by the safety contour are to be presented by a specific isolated danger symbol and put in IMO category «DISPLAYBASE» (see (3), App.2, 1.3). This task is performed by the sub-procedure "UDWHAZ03" which is called by this symbology procedure. Objects of the class "under water rock" are handled by this routine as well to ensure a consistent symbolization of isolated dangers on the seabed. |

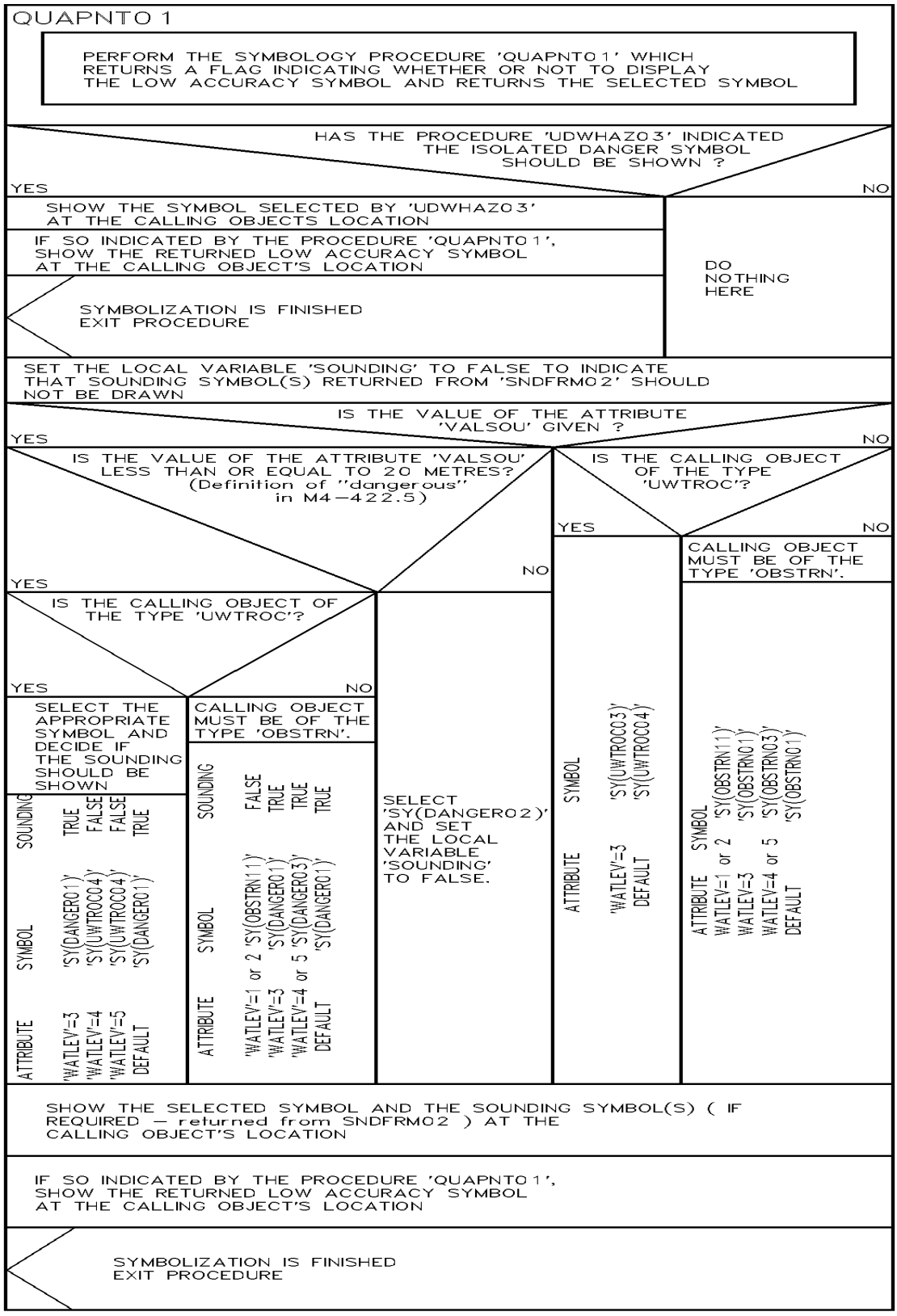
# OBSTRN04

Conditional symbology procedure for symbolizing objects of the class obstruction (OBSTRN) and underwater rock (UWTROC).



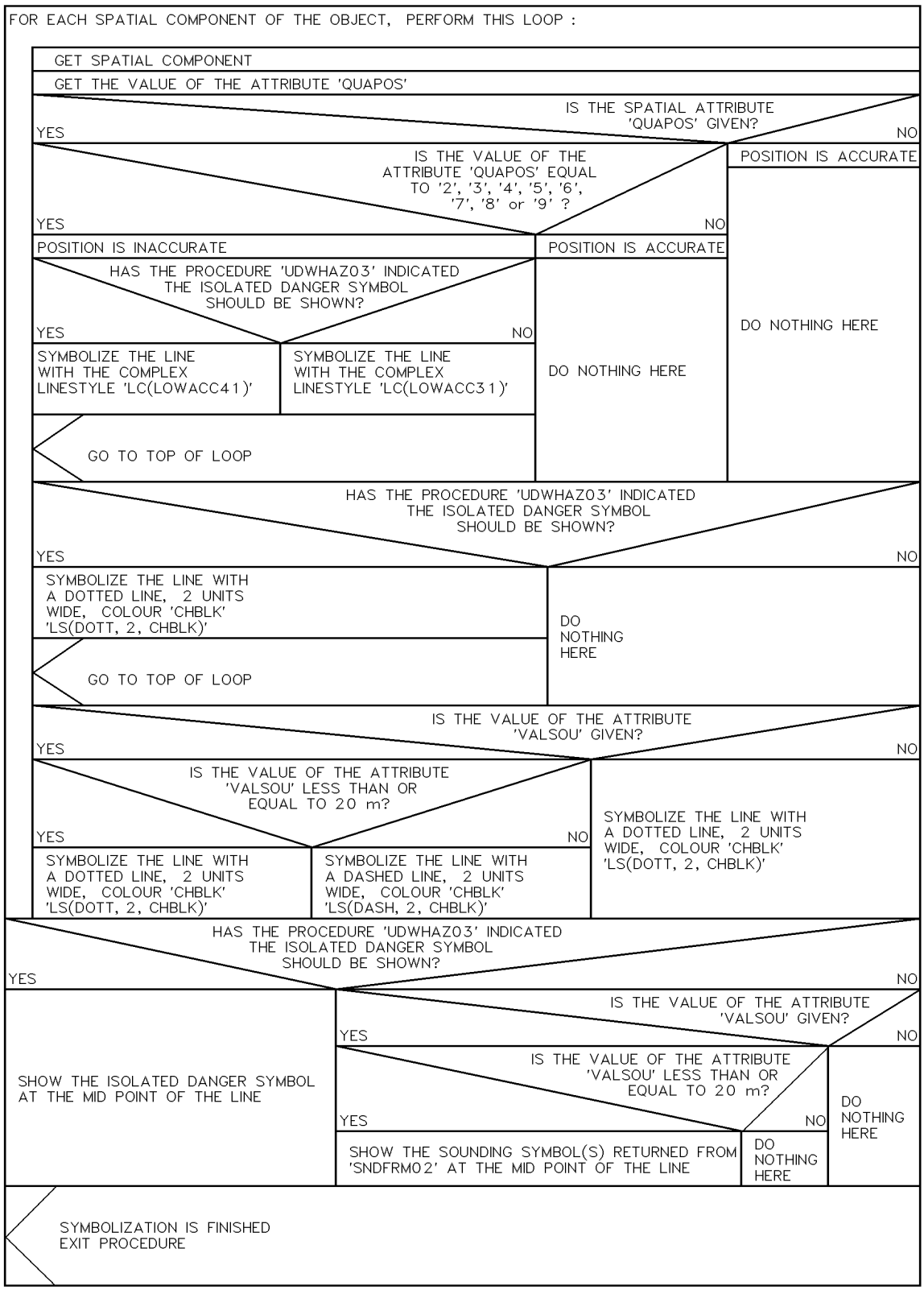
# OBSTRN04 Continuation A

Point objects, underwater rocks (UWTROC) and obstructions (OBSTRN)



# OBSTRN04 Continuation B

Line objects, obstructions (OBSTRN)



# OBSTRN04 Continuation C

Area objects, obstructions (OBSTRN)

## QUAPNT01

PERFORM THE SYMBOLOGY PROCEDURE 'QUAPNT01' WHICH RETURNS A FLAG INDICATING WHETHER OR NOT TO DISPLAY THE LOW ACCURACY SYMBOL AND RETURNS THE SELECTED SYMBOL

HAS THE PROCEDURE 'UDWHAZ03' INDICATED THAT THE ISOLATED DANGER SYMBOL SHOULD BE SHOWN ?

YES

- PRESENT THE AREA OBJECT WITH AN OPAQUE COLOUR FILL WITH THE COLOUR 'DEPVS', AND THE AREA PATTERN 'FOULAR01'
- SYMBOLIZE THE AREA BOUNDARY AS A DOTTED LINE, 2 UNITS WIDE, IN THE COLOUR 'CHBLK' LS(DOTT, 2, CHBLK)
- SHOW THE SYMBOL RETURNED BY 'UDWHAZ03' IN THE CENTRE OF THE AREA.
- IF SO INDICATED BY THE PROCEDURE 'QUAPNT01', SHOW THE RETURNED LOW ACCURACY SYMBOL IN THE CENTRE OF THE AREA
- SYMBOLIZATION IS FINISHED EXIT PROCEDURE

NO

- DO NOTHING HERE

IS THE VALUE OF THE ATTRIBUTE 'VALSOU' GIVEN ?

YES

IS THE VALUE OF THE ATTRIBUTE 'VALSOU' LESS THAN OR EQUAL TO 20m.?

YES

- SYMBOLIZE THE AREA BOUNDARY WITH A DOTTED LINE, 2 UNITS WIDE, COLOUR 'CHBLK' 'LS(DOTT, 2, CHBLK)'

NO

- SYMBOLIZE THE AREA BOUNDARY AS LS(DASH, 2, CHGRD)

NO

SELECT THE APPROPRIATE SYMBOL AS THE DEFAULT SYMBOLIZATION

| | |
|---|---|
| "OBSTRN" | "AC(DEPVS);AP(FOULAR01);LS(DOTT, 2, CHBLK" |
| "OBSTRN" "WATLEV3" "CATOBS6" | "AC(CHBRN);LS(SOLD, 2, CSTLN)" |
| "OBSTRN" "WATLEV1" (partly submerged at HW) | "AC(CHBRN);LS(SOLD, 2, CSTLN)" |
| "OBSTRN" "WATLEV2" (always dry) | "AC(DEPIT);LS(DASH, 2, CSTLN)" |
| "OBSTRN" "WATLEV4" (covers and uncovers) | "AC(DEPVS);LS(DOTT, 2, CHBLK)" |
| "OBSTRN" "WATLEV5" (awash) | "AC(DEPVS);LS(DOTT, 2, CHBLK)" |
| "OBSTRN" "WATLEV3" (always submerged) | "AC(DEPVS);LS(DOTT, 2, CHBLK)" |
| "OBSTRN" "default" | "AC(DEPVS);LS(DOTT, 2, CHBLK)" |

SHOW THE SOUNDING SYMBOL(S) RETURNED FROM 'SNDFRM01' IN THE CENTRE OF THE AREA.

- IF SO INDICATED BY THE PROCEDURE 'QUAPNT01', SHOW THE RETURNED LOW ACCURACY SYMBOL AT THE CENTRE OF THE AREA
- SYMBOLIZATION IS FINISHED EXIT PROCEDURE

### 12.2.10 Conditional Symbology Procedure 'OWNSHP02'

| | | |
|---|---|---|
| Applies to: | Mariners' Navigational Object Class "own ship" (ownshp) | |
| Spatial Object(s): | Point | |
| Attribute(s) used: | ship's length | (shplen) |
| | ship's breadth | (shpbrd) |
| | heading | (headng) |
| | course over ground | (cogcrs) |
| | course through water | (ctwcrs) |
| | speed over ground | (sogspd) |
| | speed through water | (stwspd) |
| | vector length time-period | (vecper) |
| | vector stabilization | (vecstb) |
| | vector time-mark interval | (vecmrk) |
| Parameter(s): | Object to be symbolized from SENC | |
| | Object's course and speed, heading | |
| | Options selected by mariner | |
| Defaults: | Display Priority given by look-up table | |
| | OVERRADAR priority given by look-up table | |
| | Display Category given by look-up table | |
| | Viewing Group given by look-up table | |

Remarks:

1. CONNING POSITION
   - 1.1 When own-ship is drawn to scale, the conning position must be correctly located in relation to the ship's outline. The conning position then serves as the pivot point for the own-ship symbol, to be located by the ECDIS at the correct latitude, longitude for the conning point, as computed from the positioning system, correcting for antenna offset.
   - 1.2 In this procedure it is assumed that the heading line, beam bearing line and course and speed vector originate at the conning point. If another point of origin is used, for example to account for the varying position of the ship's turning centre, this must be made clear to the mariner.

2. DISPLAY OPTIONS
   - 2.1 Only the ship symbol is mandatory for an ECDIS. The mariner should be prompted to select from the following additional optional features:

- display own-ship as:
  1. symbol, or
  2. scaled outline
- select time period determining vector length for own-ship and other vessel course and speed vectors, (all vectors must be for the same time period),
- display own-ship vector,
- select ground or water stabilization for all vectors, and select whether to display the type of stabilization, (by arrowhead),
- select one-minute or six-minute vector time marks,
- select whether to show a heading line, to the edge of the display window,
- select whether to show a beam bearing line, and if so what length (default: 10mm total length).

**OWNSHP02**

Conditional symbology procedure for symbolizing «own-ship», and for drawing the associated vector, heading line, beam-bearing line.

The own-ship is symbolized in a manner depending on which of a number of options is selected by the mariner:

**1. Mandatory selection of ship symbol or ship outline:**

1.1 If the mariner has selected one ship symbol, show SY (OWNSHP01) at the ship's position.

1.2 If the mariner has selected ship's outline:

1.2.1 If ship's length (shplen) scaled by the display scale is less than 6mm show SY (OWNSHP01) at the ship's position and display a note saying that the scale is too small to show the ship's outline.

1.2.2 Scale the outline symbol for own-ship, SY (OWNSHP05) by ships length and breadth (shplen, shpbrd) and display scale, and mark on it the known location of the conning position with a small dot. Show the scaled symbol at the correct position for the conning position. Rotate the symbol to the value of ships heading (headng).

**2. Option to show course and speed vector**

2.1 Get mariner's selection of the time-period (vecper) which determines vector length. Note that the time period selected for own-ship should apply to all other vectors.

2.2 Starting at the pivot point of the own-ship symbol or own-ship scaled representation, draw a line scaled by the vector period (vecper) and ships speed (sogspd or stwspd) in the direction given by the course (cogcrs or ctwcrs). Linestyle is LS(SOLD,2,SHIPS).

**3. Option to draw vector stabilization**

3.1 For ground stabilization (ownshp,vecstb1,...): place SY(VECGND01) at the end of the vector. Rotate the symbol in the direction given by (cogcrs).

3.2 For water stabilization (ownshp, vecstb2,...): place SY(VECWTR01) at the end of the vector. Rotate the symbol in the direction given by (ctwcrs).

**4. Option to show time marks on vector**

4.1 One-minute marks selected (ownshp, vecmrk1,... ): place SY(OSPSIX02) at every six-minute mark, and SY(OSPONE02) at every remaining one-minute mark.

4.2 Only six-minute marks selected (ownshp, vecmrk2,... ): place SY(OSPSIX02) at every six-minute mark.

**5. Option to show heading line**

5.1 If heading line selected: starting at the pivot point of the own-ship symbol or the scaled own-ship representation, draw the heading line in the direction given by (headng), to the edge of the display window. Linestyle is LS(SOLD,1,SHIPS).

**6. Option to show beam bearing line**

6.1 If beam-bearing line selected: centred on the pivot point of the own-ship symbol or the scaled own-ship representation, draw a line at 90 degrees to the heading line (headng + 90°). Length to be as selected by the mariner, with a default of 10mm total. Linestyle is LS(SOLD,1,SHIPS).

### 12.2.11 Conditional Symbology Procedure 'PASTRK01'

| | |
|---|---|
| Applies to: | Mariners' Navigational Object Class "past track" (pastrk) |
| Spatial Object(s): | Line |
| Attribute(s) used: | "category of pasttrack" (catpst) |
| Parameter(s): | Object to be symbolized from SENC<br>TIME_TAGS (min) value selected by the mariner |
| Defaults: | Display Priority given by look-up table<br>OVERRADAR priority given by look-up table<br>Display Category given by look-up table<br>Viewing Group given by look-up table |
| Remarks: | This conditional symbology procedure was designed to allow the mariner to select time labels at the pasttrack (see (3) 10.5.11.1). The procedure also cares for the presentation of primary and secondary pasttrack.<br><br>The manufacturer should define his own data class (spatial primitive) in xyt (position and time) in order to represent 'Pastrk'. |

# PASTRK01

Conditional symbology procedure for symbolization of objects of the class 'pastrk' (past track)

GET THE OBJECT WHICH IS CALLING THIS PROCEDURE

GET THE VALUE OF THE OBJECT'S ATTRIBUTE 'catpst' (category of pastttrack)

DOES THE VALUE OF THE ATTRIBUTE 'catpst' EQUAL '1' (primary pasttrack) ?

YES

SYMBOLIZE THE PRIMARY PAST TRACK WITH A SOLID LINE, 2 UNITS WIDE, COLOUR 'PSTRK' 'LS(SOLD, 2, PSTRK)'

SELECT SYMBOL 'SY(PASTRK01)'

SET CATEGORY TO 'STANDARD'

SET VIEWING GROUP TO '52430'

NO

SYMBOLIZE THE SECONDARY PAST TRACK WITH A SOLID LINE, 1 UNIT WIDE, COLOUR 'SYTRK' 'LS(SOLD, 1, SYTRK)'

SELECT SYMBOL 'SY(PASTRK02)'

SET CATEGORY TO 'STANDARD'

SET VIEWING GROUP TO '52460'

IS THE VALUE OF THE 'TIME-TAGS' ENTERED BY THE MARINER GREATER THAN ZERO ?

YES

PLACE A COPY OF THE SELECTED SYMBOL AT EACH RECORDED POSITION OF THE PAST TRACK WHERE THE RECORDED TIME IS A MULTIPLE OF 'TIME-TAGS'.

ROTATE THE SYMBOL TO THE ORIENTATION OF THE RESPECTIVE PAST TRACK SECTION.

PLACE A TEXT LABEL WITH PREFIX ''t'' AT THE SYMBOL'S POSITION SHOWING THE RECORDED TIME IN INTEGER MINUTES (hhmm OR mm). USE THE COLOUR 'CHBLK'. FONT IS SANS-SERIF, NON-ITALIC, CHARACTER WEIGHT IS 'MEDIUM', BODY SIZE 10

[IMO PS 10.5.11.1]

NO

DO NOTHING HERE

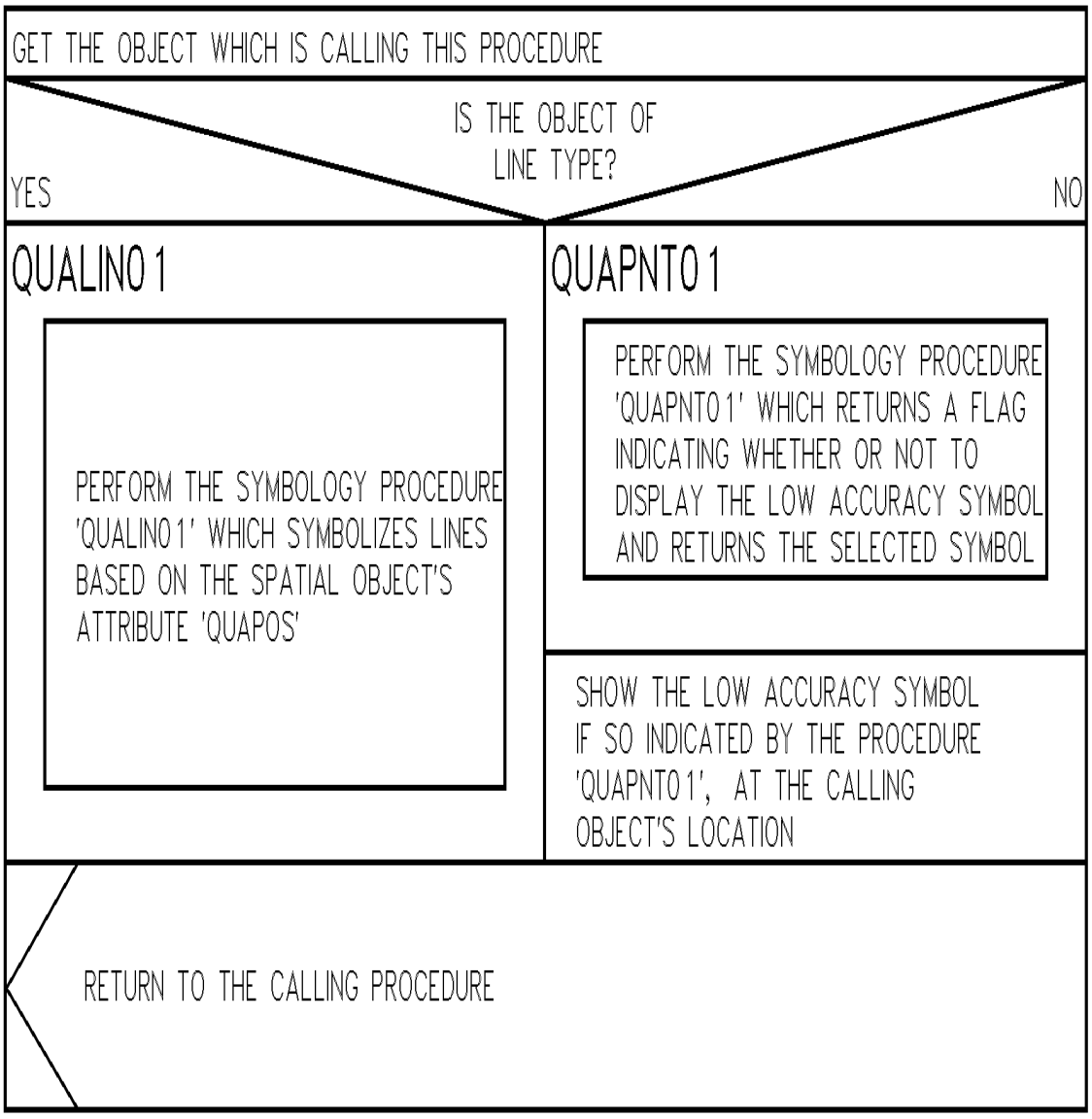
SYMBOLIZATION IS FINISHED
EXIT PROCEDURE

### 12.2.12 Conditional Symbology Procedure 'QUAPOS01'

| | |
|---|---|
| Applies to: | S-57 Object Class "land area" (LNDARE), as point and line<br>S-57 Object Class «coast line» (COALNE), line only |
| Spatial Object(s): | Point, Line |
| Attribute(s) used: | Spatial attribute QUAPOS |
| Parameter(s): | Object to be symbolised from SENC |
| Defaults: | Symbolization given by the look-up table<br>Display Priority given by look-up table<br>OVERRADAR priority given by look-up table<br>Display Category given by look-up table<br>Viewing Group given by look-up table |
| Remarks: | The attribute QUAPOS, which identifies low positional accuracy, is attached to the spatial object, not the feature object<br><br>This procedure passes the object to procedure QUALIN01 or QUAPNT01, which traces back to the spatial object, retrieves any QUAPOS attributes, and returns the appropriate symbolization to QUAPOS01. |

# QUAPOS01

Conditional Symbology Procedure to apply spatial attribute 'QUAPOS' to 'LNDARE' and 'COALNE'.



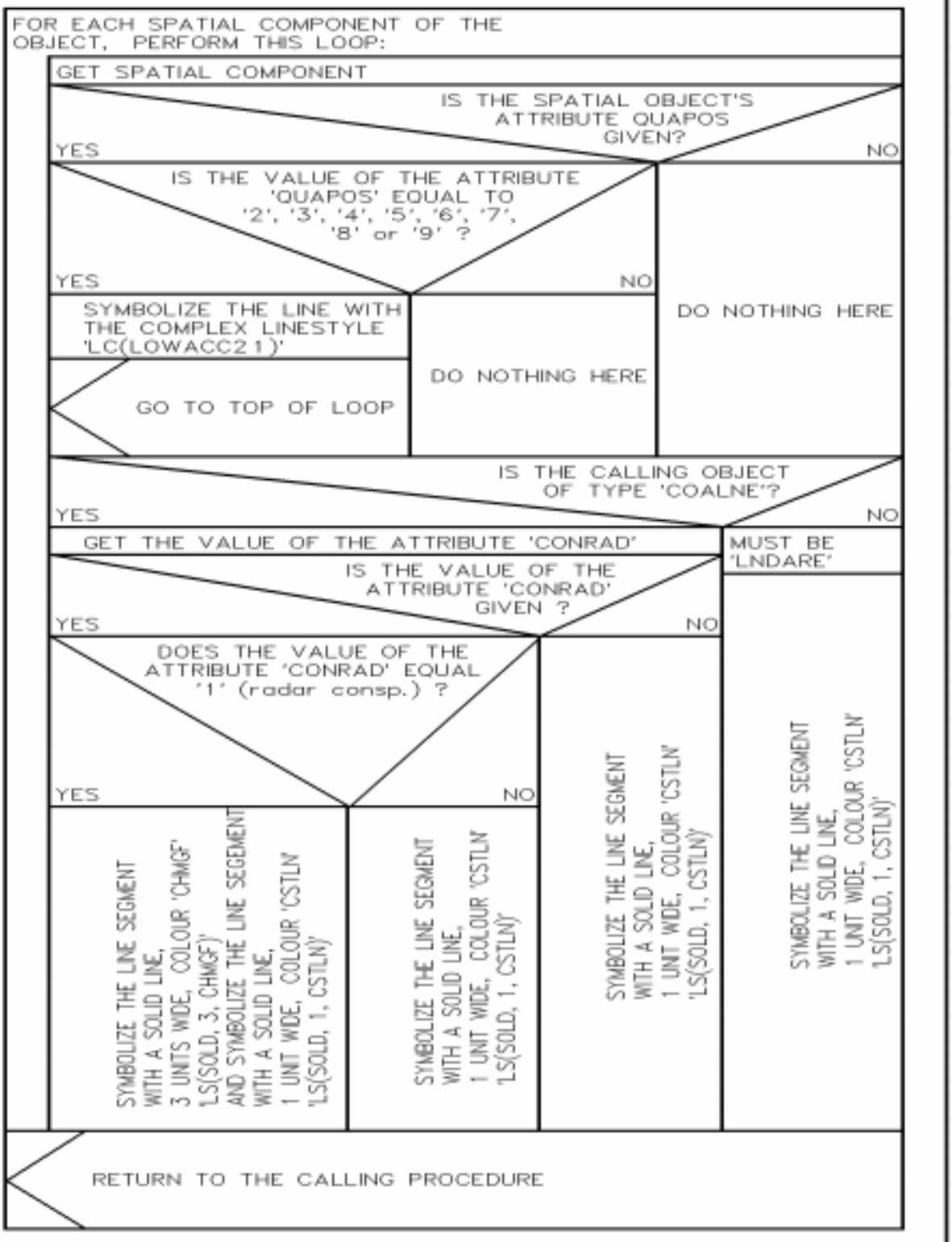
### 12.2.13 Conditional Symbology Procedure 'QUALIN01'

(Note that this is called as a sub-procedure by QUAPOS01).

| | |
|---|---|
| Applies to: | S-57 Object Class land area (LNDARE) as line<br>S-57 Object Class coastline (COALNE) line only. |
| Spatial Object(s): | Line |
| Attribute(s) used: | spatial attribute QUAPOS |
| Parameter(s): | Object to be symbolised from SENC. |
| Defaults: | Display Priority given by look-up table<br>OVERRADAR priority given by look-up table<br>Display Category given by look-up table<br>Viewing Group given by look-up table |
| Remarks: | The attribute QUAPOS, which identifies low positional accuracy, is attached only to the spatial component(s) of an object.<br><br>A line object may be composed of more than one spatial object. This procedure looks at each of the spatial objects, and symbolizes the line according to the positional accuracy. |

# QUALINO 1

Conditional Symbology Procedure for the symbology of line objects when positional accuracy is low.
Please note that this procedure is called by other procedures.



### 12.2.14 Conditional Symbology Procedure 'QUAPNT01'

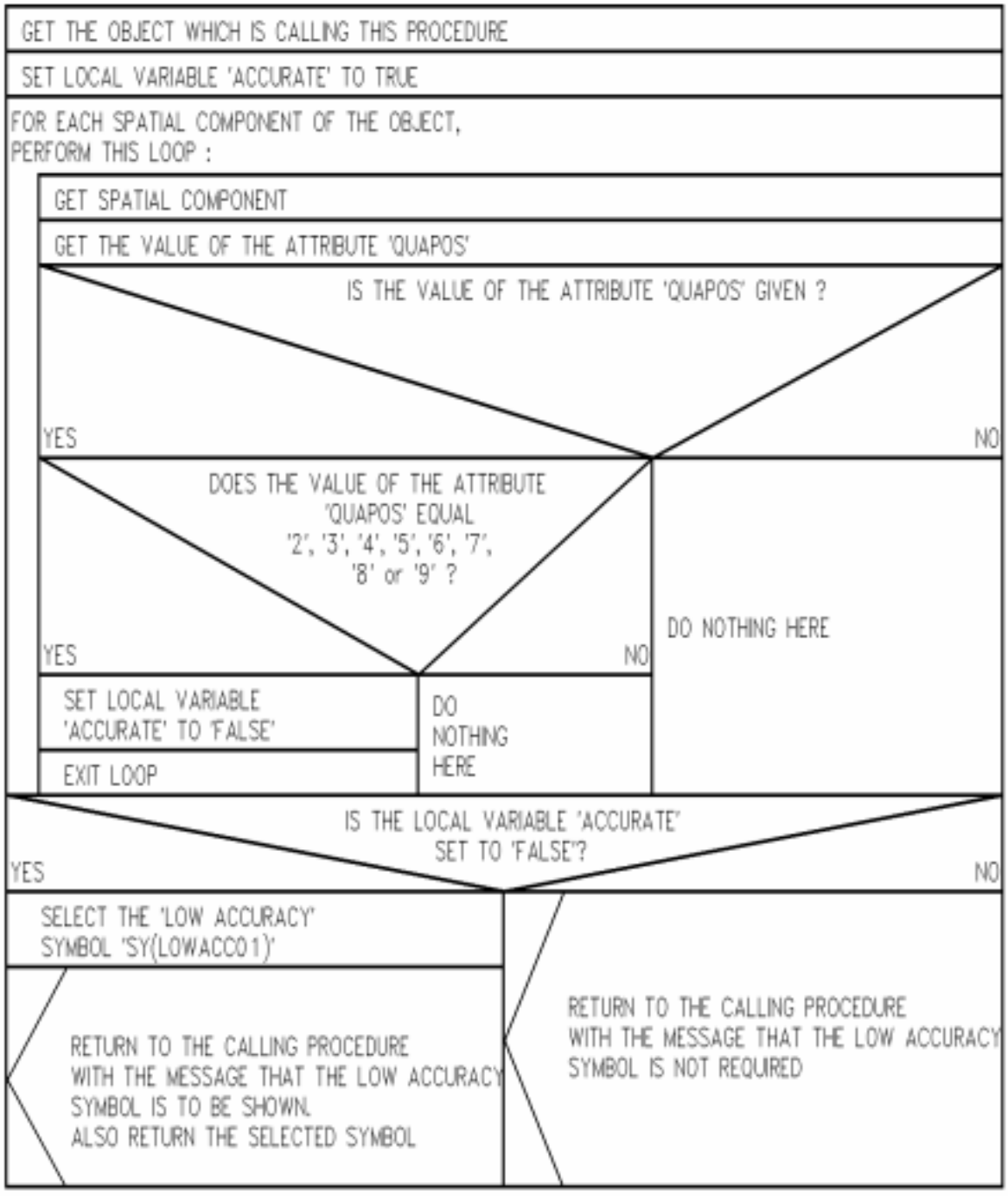
(Note that this is called as a sub-procedure by QUAPOS01, WRECKS02).

| | |
|---|---|
| Applies to: | S-57 Object Class land area (LNDARE) as point<br>S-57 Object Class wrecks (WRECKS) as point and area. |
| Spatial Object(s): | Point, Area. |
| Attribute(s) used: | spatial attribute QUAPOS |
| Parameter(s): | Object to be symbolised from SENC. |
| Defaults: | Symbolization given by the look-up table<br>Display Priority given by look-up table<br>OVERRADAR priority given by look-up table<br>Display Category given by look-up table<br>Viewing Group given by look-up table |
| Remarks: | The attribute QUAPOS, which identifies low positional accuracy, is attached only to the spatial component(s) of an object.<br><br>This procedure retrieves any QUAPOS attributes, and returns the appropriate symbols to the calling procedure. |

# QUAPNT01

Conditional Symbology Procedure for additional symbology for point and area objects when positional accuracy is low.

Please note that this procedure is called by other procedures.

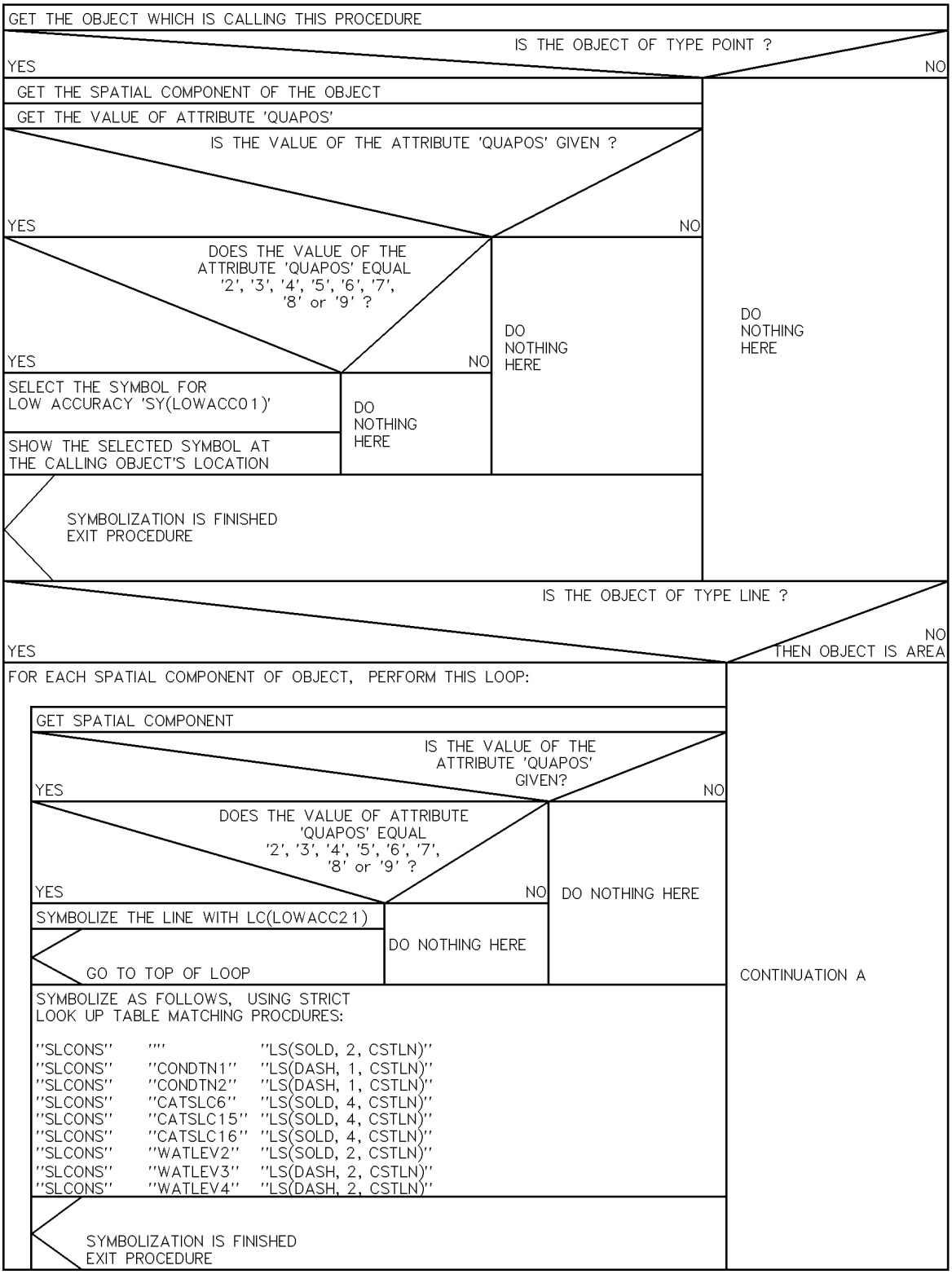


### 12.2.15 Conditional Symbology Procedure 'SLCONS03'

| | |
|---|---|
| Applies to: | S-57 Object Class "shoreline construction" (SLCONS) |
| Spatial Object(s): | Point, Line, Area |
| Attribute(s) used: | Spatial attribute QUAPOS |
| Parameter(s): | Object to be symbolised from SENC |
| Defaults: | Display Priority given by look-up table<br>OVERRADAR priority given by look-up table<br>Display Category given by look-up table<br>Viewing Group given by look-up table |
| Remarks: | Shoreline construction objects which have a QUAPOS attribute on their spatial component indicating that their position is unreliable are symbolized by a special linestyle in the place of the varied linestyles normally used. Otherwise this procedure applies the normal symbolization. |

# SLCONS03

Conditional Symbology Procedure for symbolizing shoreline construction objects.



# SLCONS03 Continuation A

Continuation A: Type Area

FOR EACH SPATIAL COMPONENT OF THE AREA BOUNDARY, PERFORM THIS LOOP :

GET SPATIAL COMPONENT

IS THE VALUE OF THE ATTRIBUTE 'QUAPOS' GIVEN ?

YES

NO

DOES THE VALUE OF THE ATTRIBUTE 'QUAPOS' EQUAL '2', '3', '4', '5', '6', '7', '8' or '9'?

YES

NO

DO NOTHING HERE

SYMBOLIZE THE AREA WITH AN AREA BOUNDARY OF LC(LOWACC21)

DO NOTHING HERE

GO TO TOP OF LOOP

SYMBOLIZE AS FOLLOWS, USING STRICT LOOK UP TABLE MATCHING PROCDURES:

| | | |
|---|---|---|
| "SLCONS" | "" | "LS(SOLD, 2, CSTLN)" |
| "SLCONS" | "CONDTN1" | "LS(DASH, 1, CSTLN)" |
| "SLCONS" | "CONDTN2" | "LS(DASH, 1, CSTLN)" |
| "SLCONS" | "CATSLC6" | "LS(SOLD, 4, CSTLN)" |
| "SLCONS" | "CATSLC15" | "LS(SOLD, 4, CSTLN)" |
| "SLCONS" | "CATSLC16" | "LS(SOLD, 4, CSTLN)" |
| "SLCONS" | "WATLEV2" | "LS(SOLD, 2, CSTLN)" |
| "SLCONS" | "WATLEV3" | "LS(DASH, 2, CSTLN)" |
| "SLCONS" | "WATLEV4" | "LS(DASH, 2, CSTLN)" |

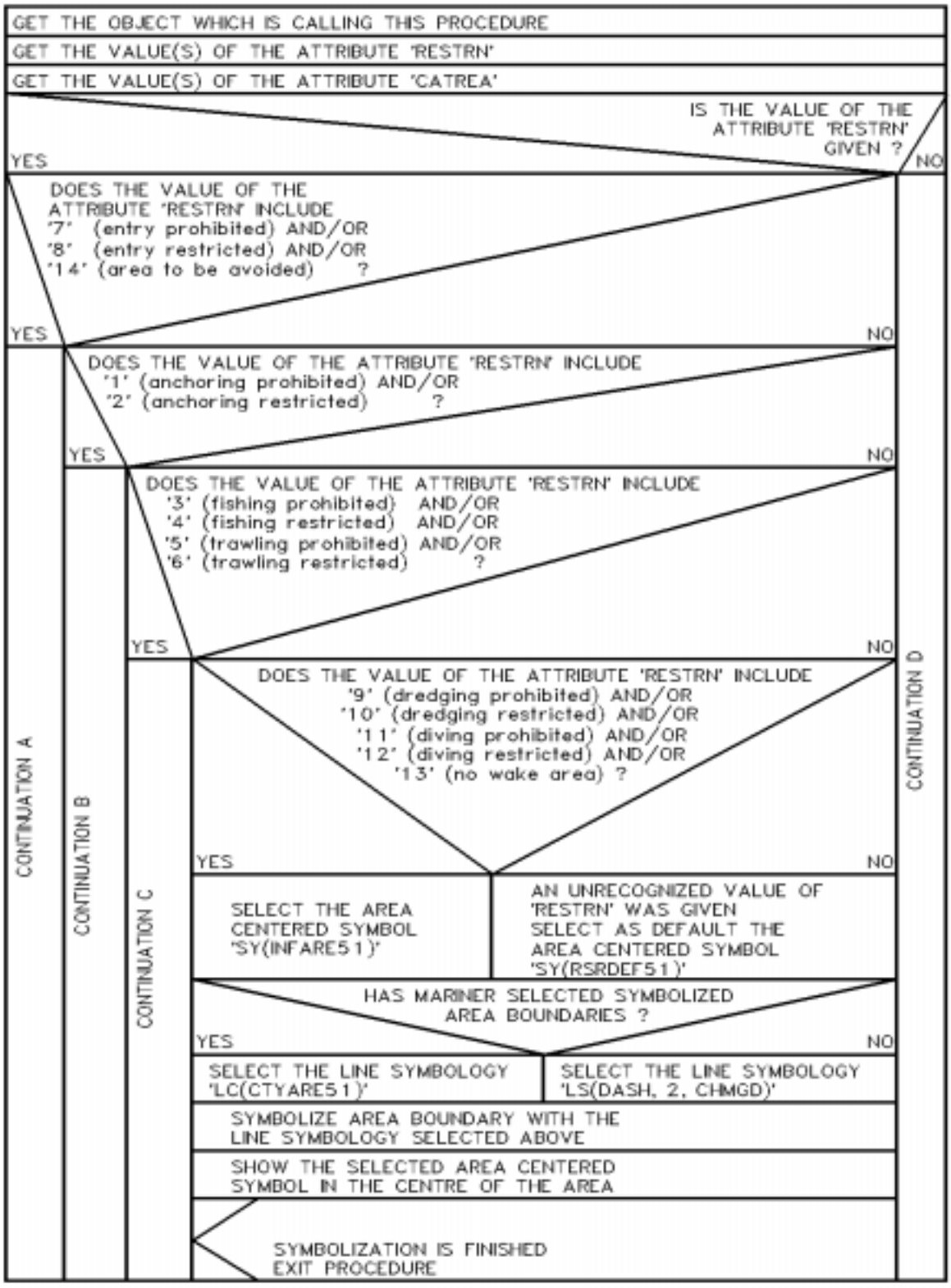
SYMBOLIZATION IS FINISHED
EXIT PROCEDURE

### 12.2.16 Conditional Symbology Procedure 'RESARE02'

| | |
|---|---|
| Applies to: | S-57 objects of class Restricted Area (RESARE) |
| Spatial Object(s): | Area |
| Attribute(s) used | CATREA, RESTRN (List-type) |
| Defaults: | Display priority given by look-up table<br>OVERRADAR priority given by look-up table<br>Display category given by look-up table<br>Viewing group given by look-up table |
| Remarks: | A list-type attribute is used because an area of the object class RESARE may have more than one category (CATREA). For example an inshore traffic zone might also have fishing and anchoring prohibition and a prohibited area might also be a bird sanctuary or a mine field.<br><br>This conditional procedure is set up to ensure that the categories of most importance to safe navigation are prominently symbolized, and to pass on all given information with minimum clutter. Only the most significant restriction is symbolized, and an indication of further limitations is given by a subscript «!» or «I». Further details are given under conditional symbology procedure RESTRN01<br><br>Other object classes affected by attribute RESTRN are handled by conditional symbology procedure RESTRN01. |

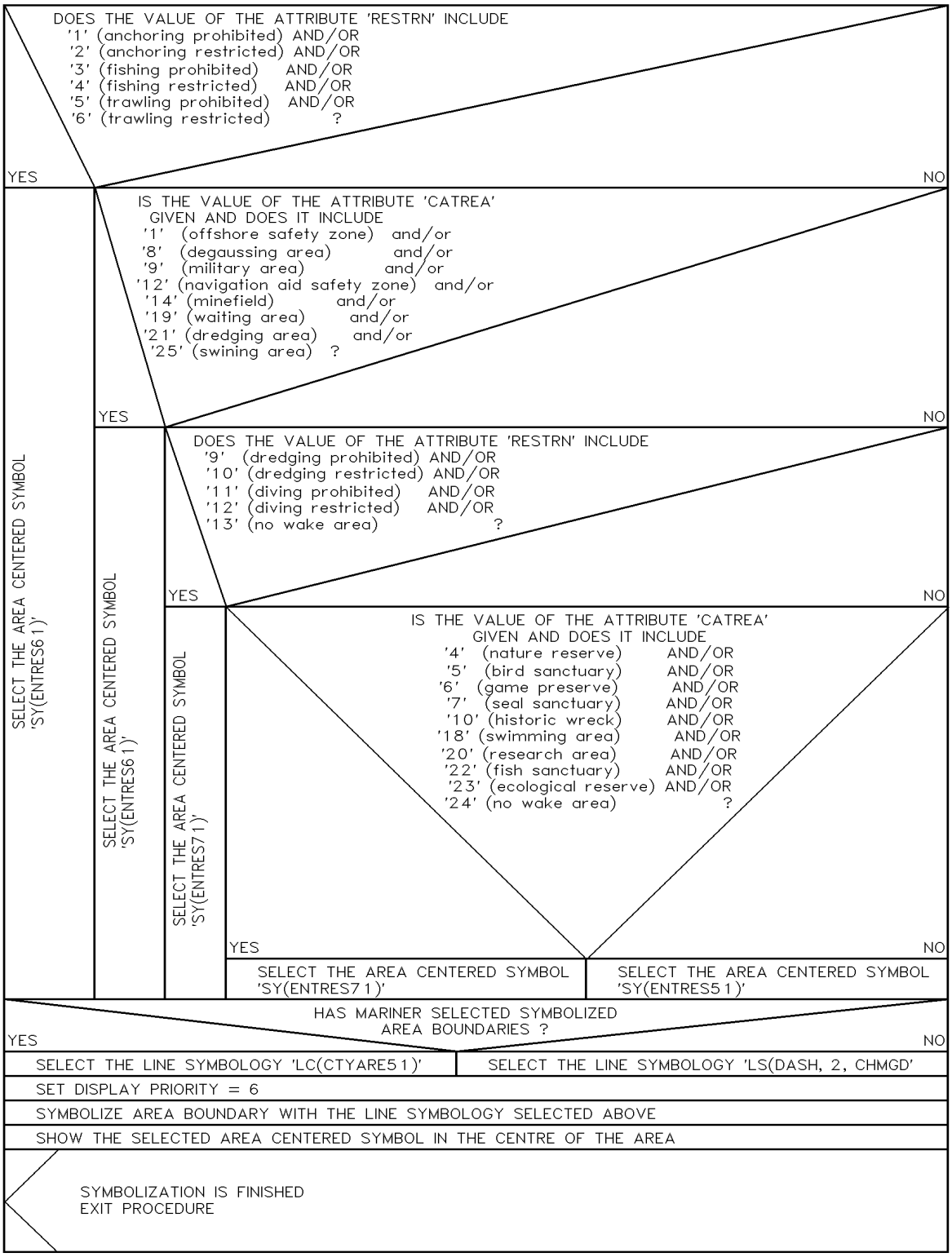
# RESARE02

Conditional symbology procedure for all objects RESARE.



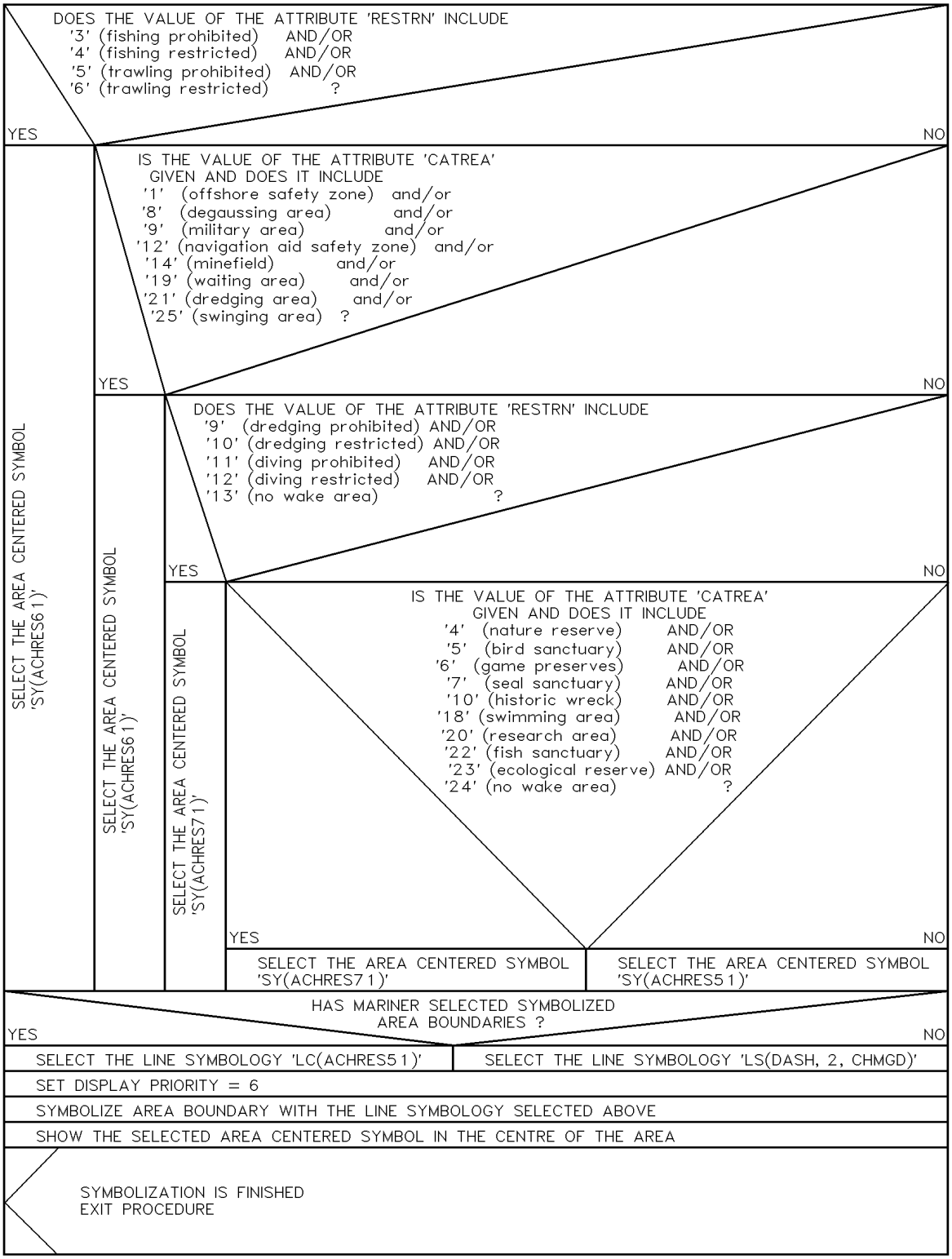
# RESARE02 Continuation A

Entry Restricted or prohibited



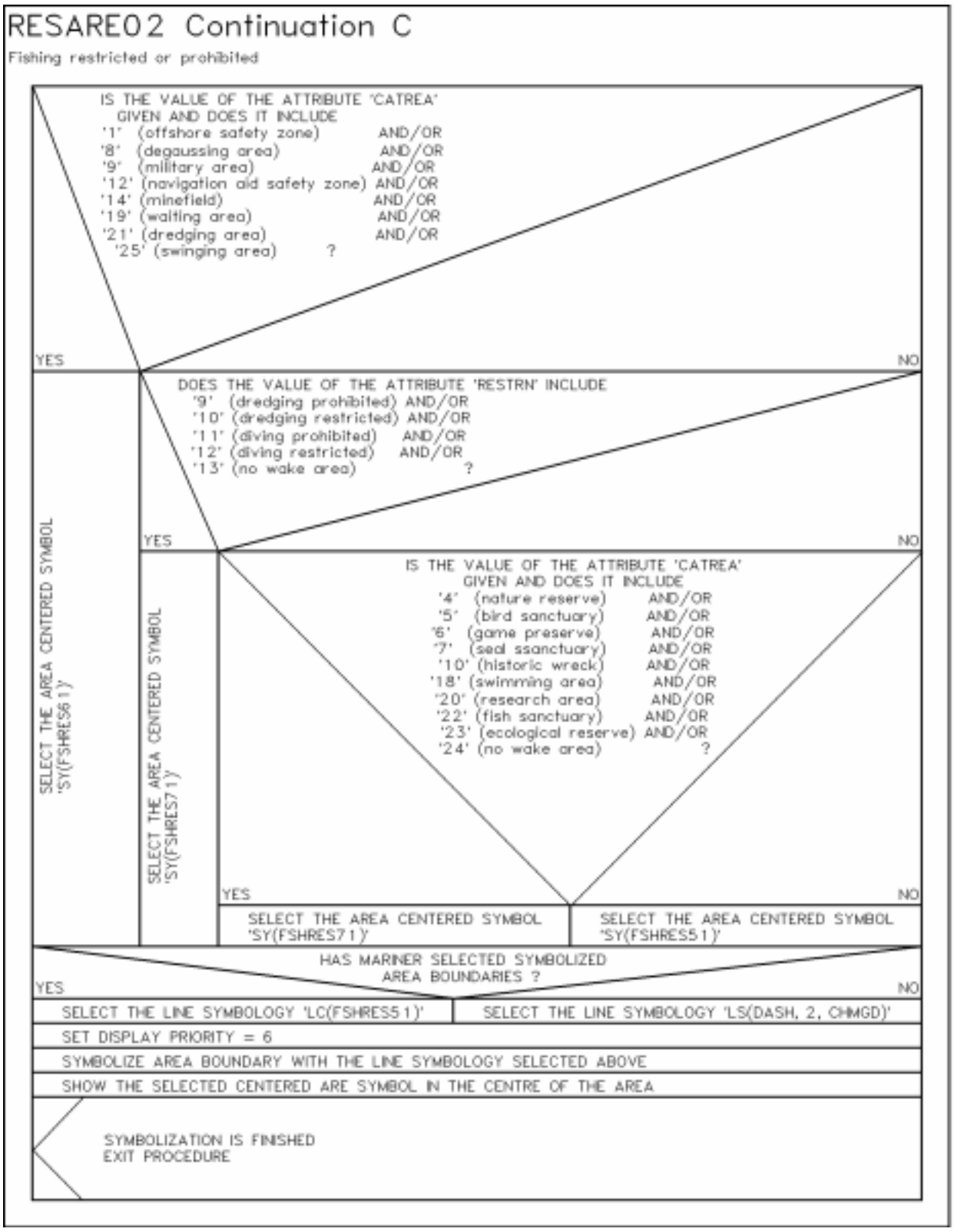
# RESARE02 Continuation B

Anchoring restricted or prohibited



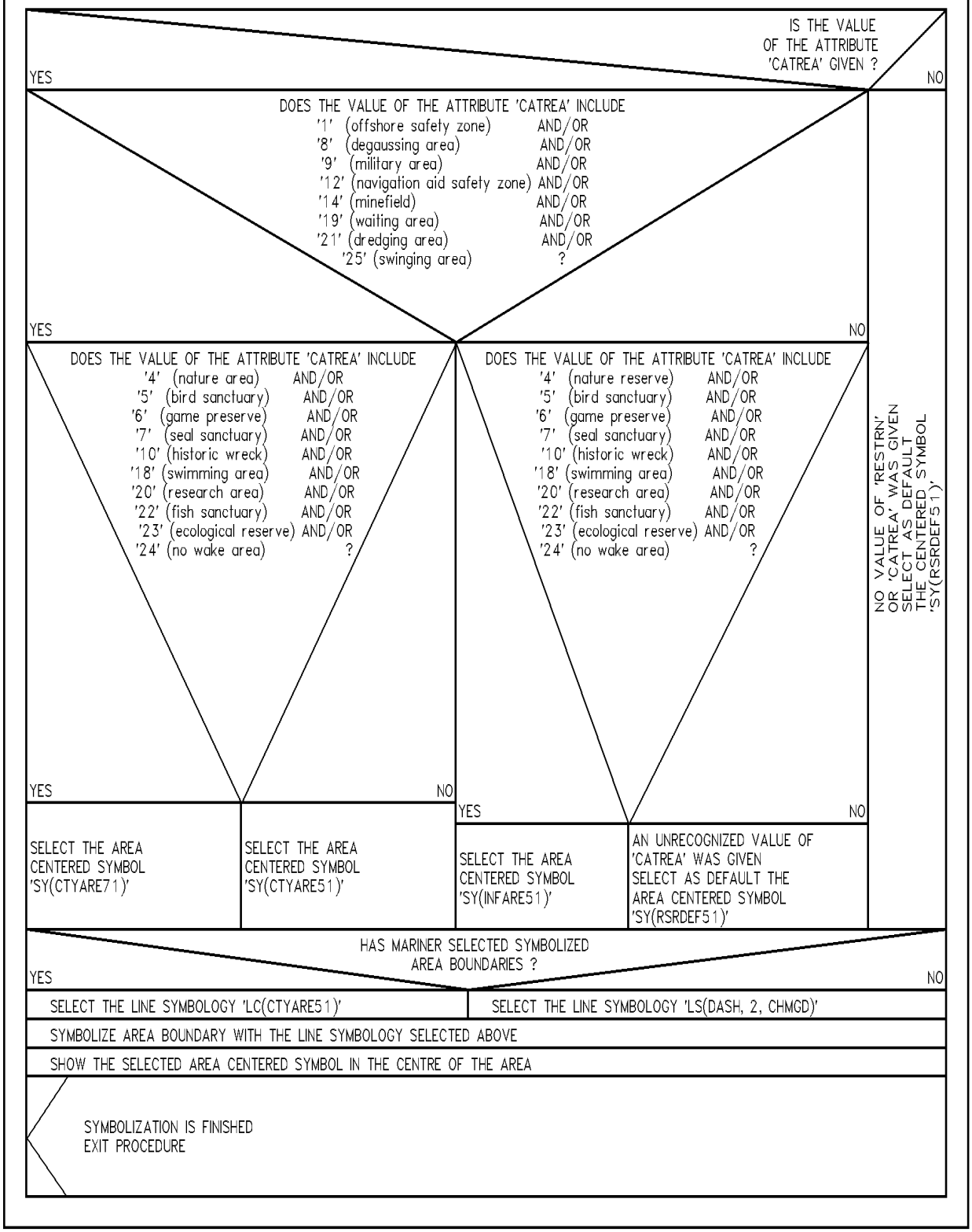
# RESARE02 Continuation C

Fishing restricted or prohibited



# RESARE02 Continuation D

No 'RESTRN' applies



### 12.2.17 Conditional Symbology Procedure 'RESTRN01'

Applies to: The following S-57 Object Class objects, but only when they carry the attribute RESTRN:
TSSLPT, TSSRON, TSSCRS, DWRTPT, PRCARE, ISTZNE;
FAIRWAY, DRGARE, ACHARE;
CBLARE, PIPARE, DMPGRD, MARCUL;
OSPARE, SUBTLN, SPLARE, MIPARE, ICNARE;
TESARE

Spatial Object(s): Area

Parameter(s): Object to by symbolized from ENC.

Defaults: Symbolization given by the look-up table
Display Priority given by look-up table
OVERRADAR priority given by look-up table
Display Category given by look-up table
Viewing Group given by look-up table

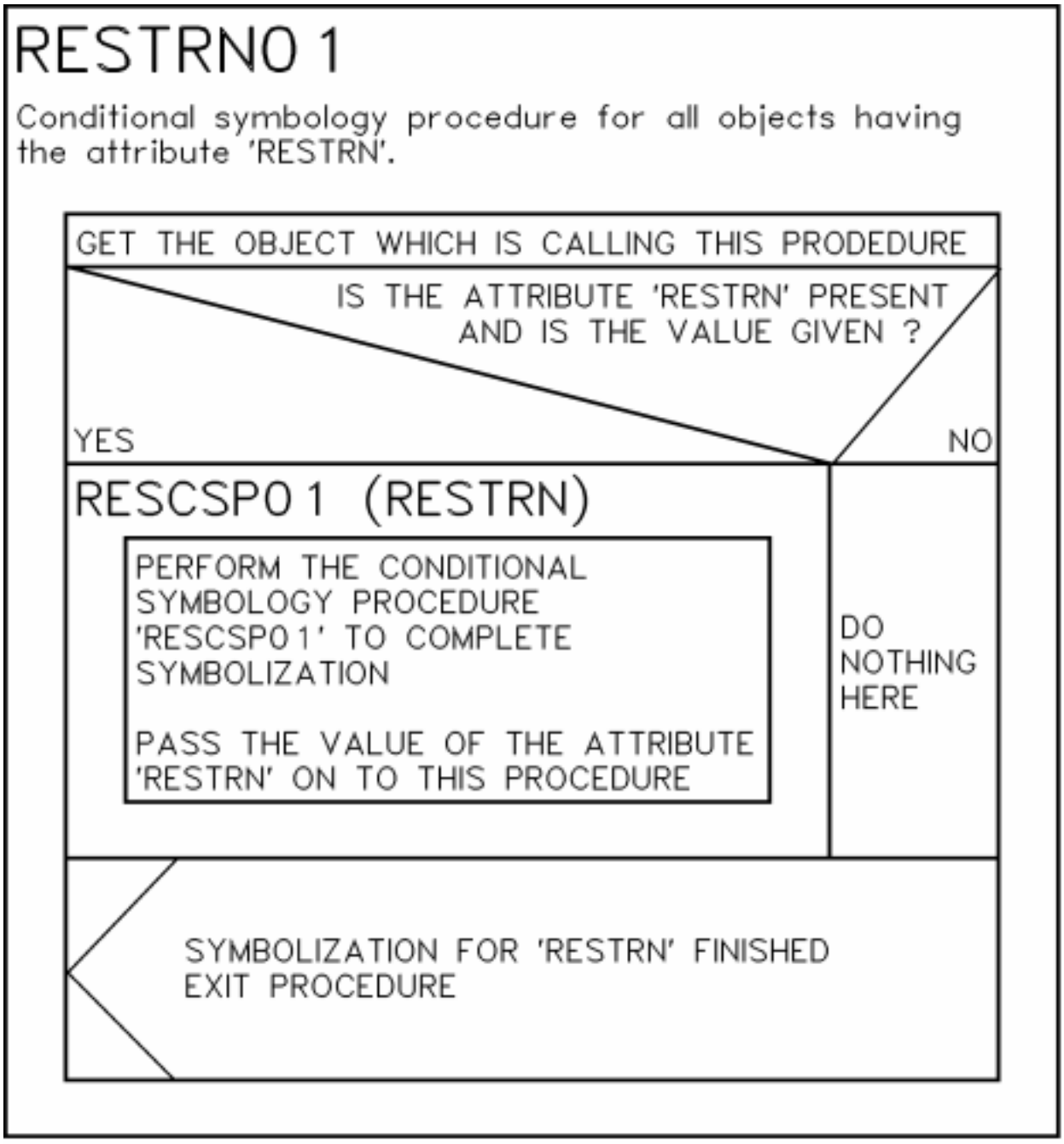
Remarks: Objects subject to RESTRN01 are actually symbolised in sub-process RESCSP01, since the latter can also be accessed from other conditional symbology procedures. RESTRN01 merely acts as a «signpost» for RESCSP01.

Object class RESARE is symbolised for the effect of attribute RESTRN in a separate conditional symbology procedure called RESARE02.

Since many of the areas concerned cover shipping channels, the number of symbols used is minimised to reduce clutter. To do this, values of RESTRN are ranked for significance as follows:

«Traffic Restriction» values of RESTRN:
(1) RESTRN 7,8: entry prohibited or restricted
RESTRN 14: IMO designated «area to be avoided» part of a TSS
(2) RESTRN 1,2: anchoring prohibited or restricted
(3) RESTRN 3,4,5,6: fishing or trawling prohibited or restricted
(4) «Other Restriction» values of RESTRN are:
RESTRN 9,10: dredging prohibited or restricted,
RESTRN 11, 12: diving prohibited or restricted,
RESTRN 13: no wake area.

Unlike all other originators of conditional symbology procedures, RESTRN is an attribute, not an object class. It is therefore not possible to provide viewing groups for the restrictions it imposes without creating undesirable complications in the procedure.


RESTRN01
Conditional symbology procedure for all objects having the attribute 'RESTRN'.
GET THE OBJECT WHICH IS CALLING THIS PRODEDURE
IS THE ATTRIBUTE 'RESTRN' PRESENT AND IS THE VALUE GIVEN ?
YES
NO
RESCSP01 (RESTRN)
PERFORM THE CONDITIONAL SYMBOLOGY PROCEDURE 'RESCSP01' TO COMPLETE SYMBOLIZATION
PASS THE VALUE OF THE ATTRIBUTE 'RESTRN' ON TO THIS PROCEDURE
DO NOTHING HERE
SYMBOLIZATION FOR 'RESTRN' FINISHED
EXIT PROCEDURE

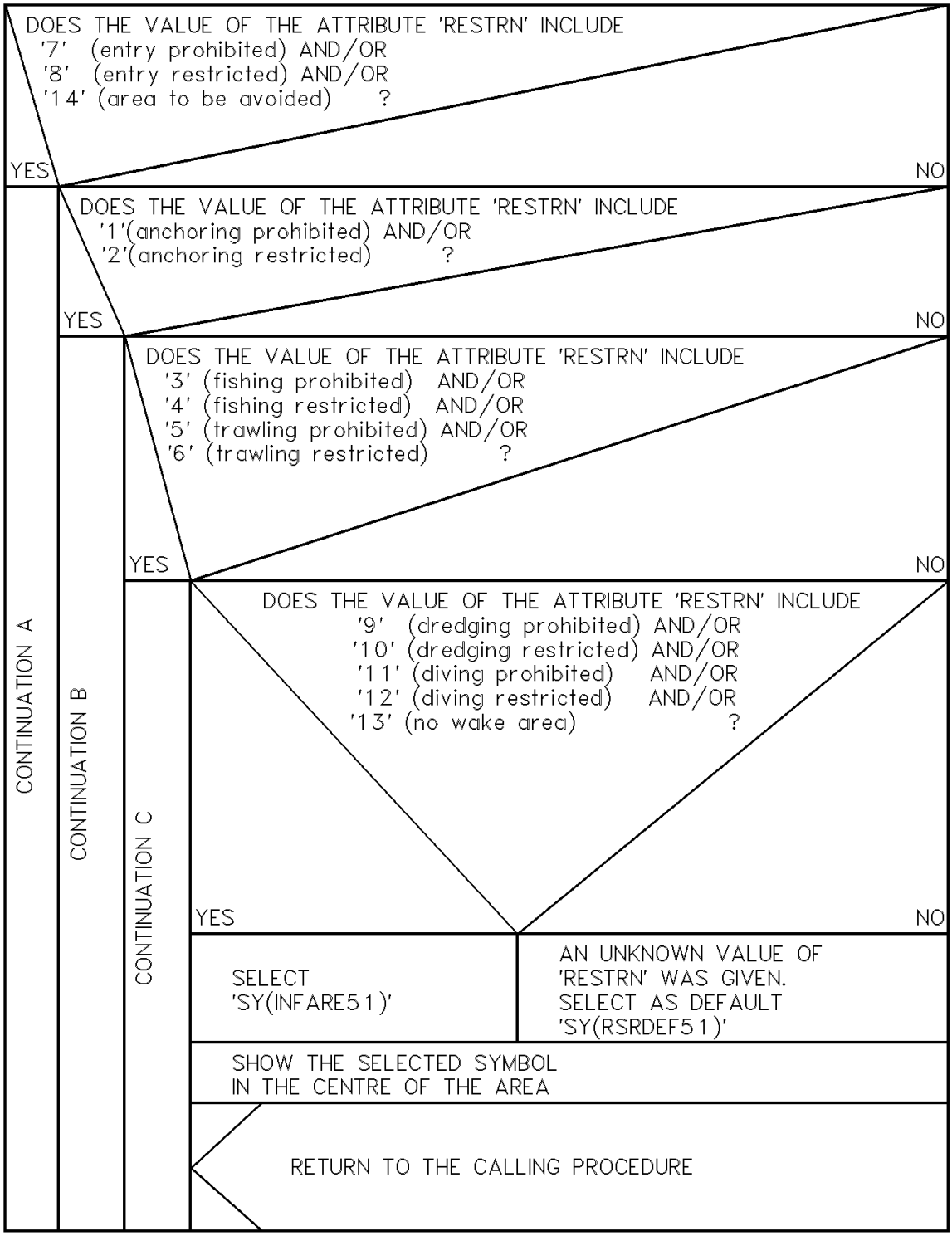
### 12.2.18 Conditional Symbology Procedure 'RESCSP01'

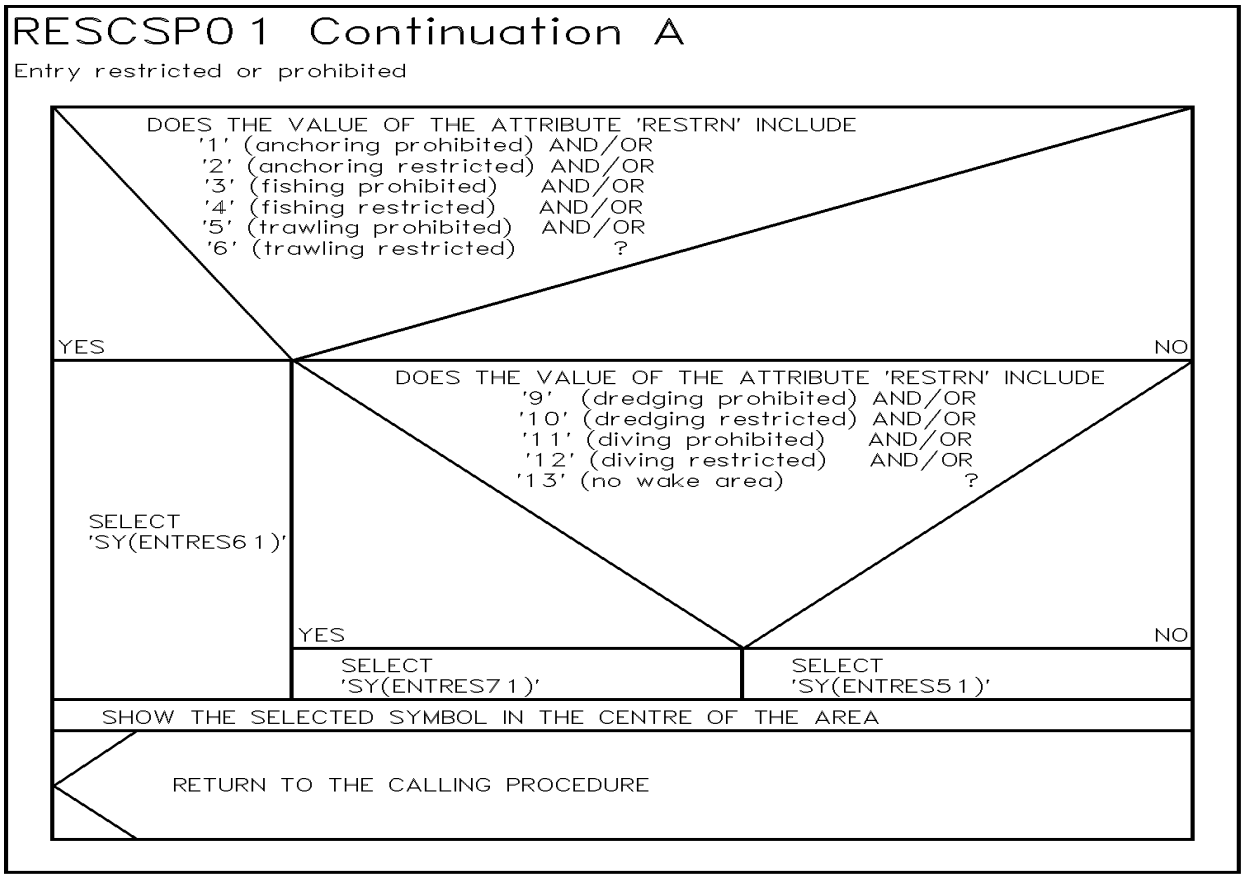
(Note that this is called as a sub-procedure by DEPARE01 and RESTRN01)

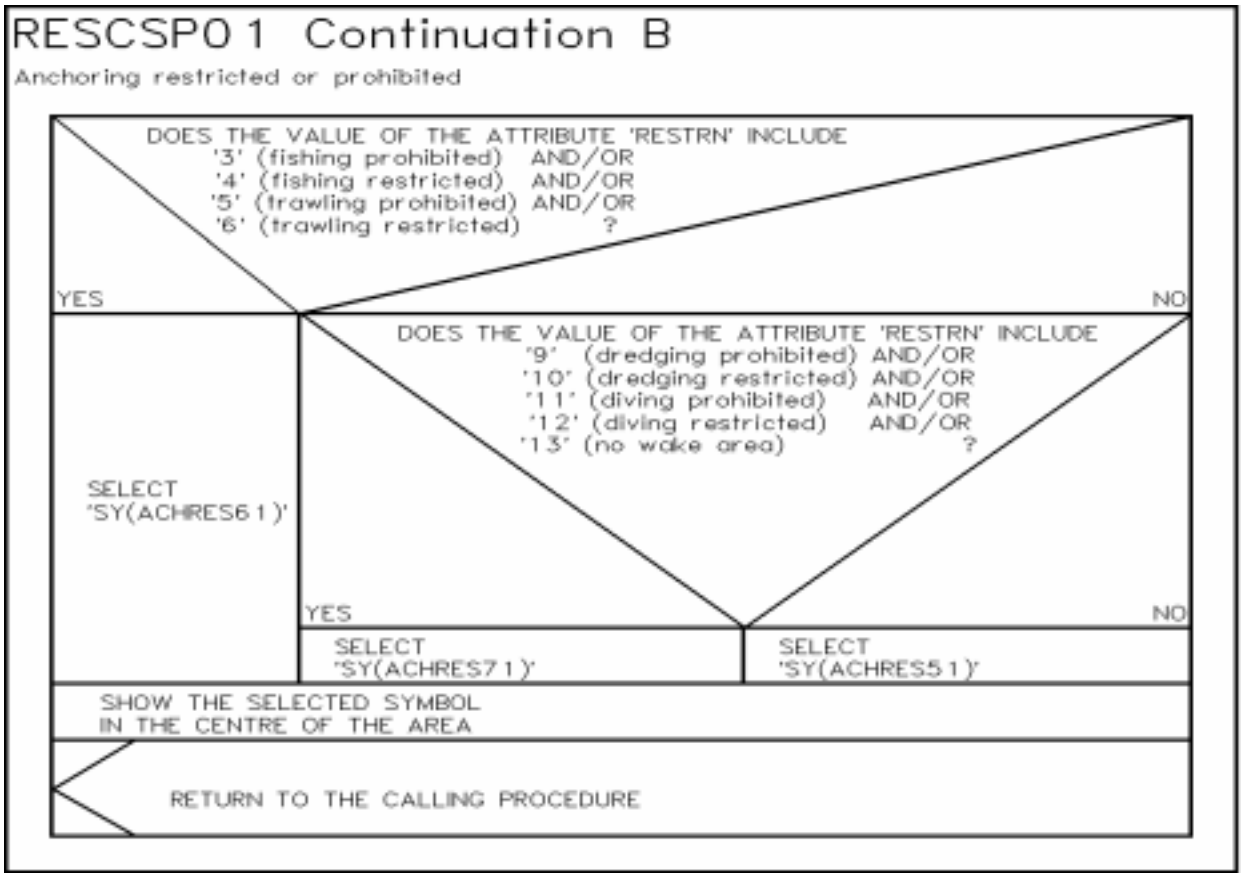
| | |
|---|---|
| Applies to: | Applies to the following S-57 Object Classes, but only when they carry the attribute RESTRN:<br>TSSLPT, TSSRON, TSSCRS, DWRTPT, PRCARE, ISTZNE;<br>FAIRWAY, DRGARE, ACHARE;<br>CBLARE, PIPARE, DMPGRD, MARCUL;<br>OSPARE, SUBTLN, SPLARE, MIPARE, ICNARE;<br>TESARE |
| Spatial Object(s): | Area |
| Parameter(s): | Object to be symbolised from ENC. |
| Defaults: | Symbolization given by the look-up table<br>Display Priority given by look-up table<br>OVERRADAR priority given by look-up table<br>Display Category given by look-up table<br>Viewing Group given by look-up table |
| Remarks: | See procedure RESTRN01 |

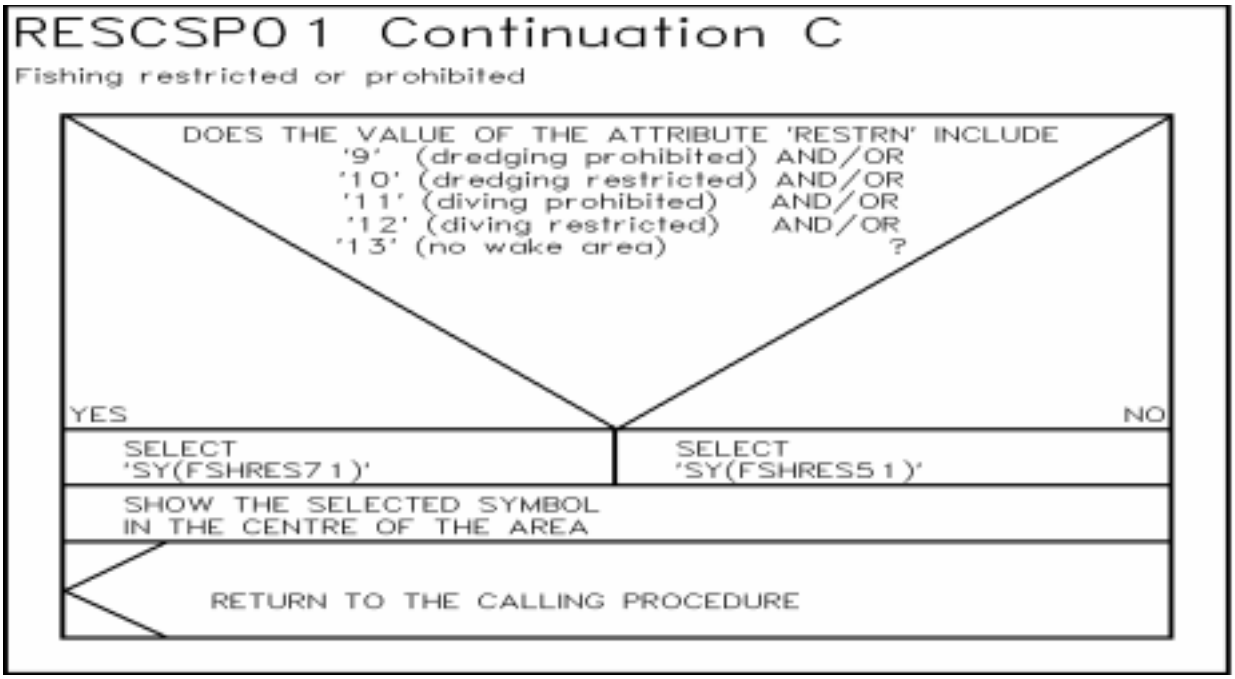
# RESCSP01 ( RESTRN )

Conditional symbology procedure for all objects having the attribute 'RESTRN'.
Please note that this symbology procedure is called by other procedures.
'RESTRN' is passed on to this procedure by the calling procedure.




RESCSP01 Continuation A
Entry restricted or prohibited
DOES THE VALUE OF THE ATTRIBUTE 'RESTRN' INCLUDE
'1' (anchoring prohibited) AND/OR
'2' (anchoring restricted) AND/OR
'3' (fishing prohibited) AND/OR
'4' (fishing restricted) AND/OR
'5' (trawling prohibited) AND/OR
'6' (trawling restricted) ?
YES
NO
SELECT
'SY(ENTRES61)'
DOES THE VALUE OF THE ATTRIBUTE 'RESTRN' INCLUDE
'9' (dredging prohibited) AND/OR
'10' (dredging restricted) AND/OR
'11' (diving prohibited) AND/OR
'12' (diving restricted) AND/OR
'13' (no wake area) ?
YES
NO
SELECT
'SY(ENTRES71)'
SELECT
'SY(ENTRES51)'
SHOW THE SELECTED SYMBOL IN THE CENTRE OF THE AREA
RETURN TO THE CALLING PROCEDURE


RESCSP01 Continuation B
Anchoring restricted or prohibited
DOES THE VALUE OF THE ATTRIBUTE 'RESTRN' INCLUDE
'3' (fishing prohibited) AND/OR
'4' (fishing restricted) AND/OR
'5' (trawling prohibited) AND/OR
'6' (trawling restricted) ?
YES
NO
DOES THE VALUE OF THE ATTRIBUTE 'RESTRN' INCLUDE
'9' (dredging prohibited) AND/OR
'10' (dredging restricted) AND/OR
'11' (diving prohibited) AND/OR
'12' (diving restricted) AND/OR
'13' (no wake area) ?
SELECT
'SY(ACHRES61)'
YES
NO
SELECT
'SY(ACHRES71)'
SELECT
'SY(ACHRES51)'
SHOW THE SELECTED SYMBOL
IN THE CENTRE OF THE AREA
RETURN TO THE CALLING PROCEDURE

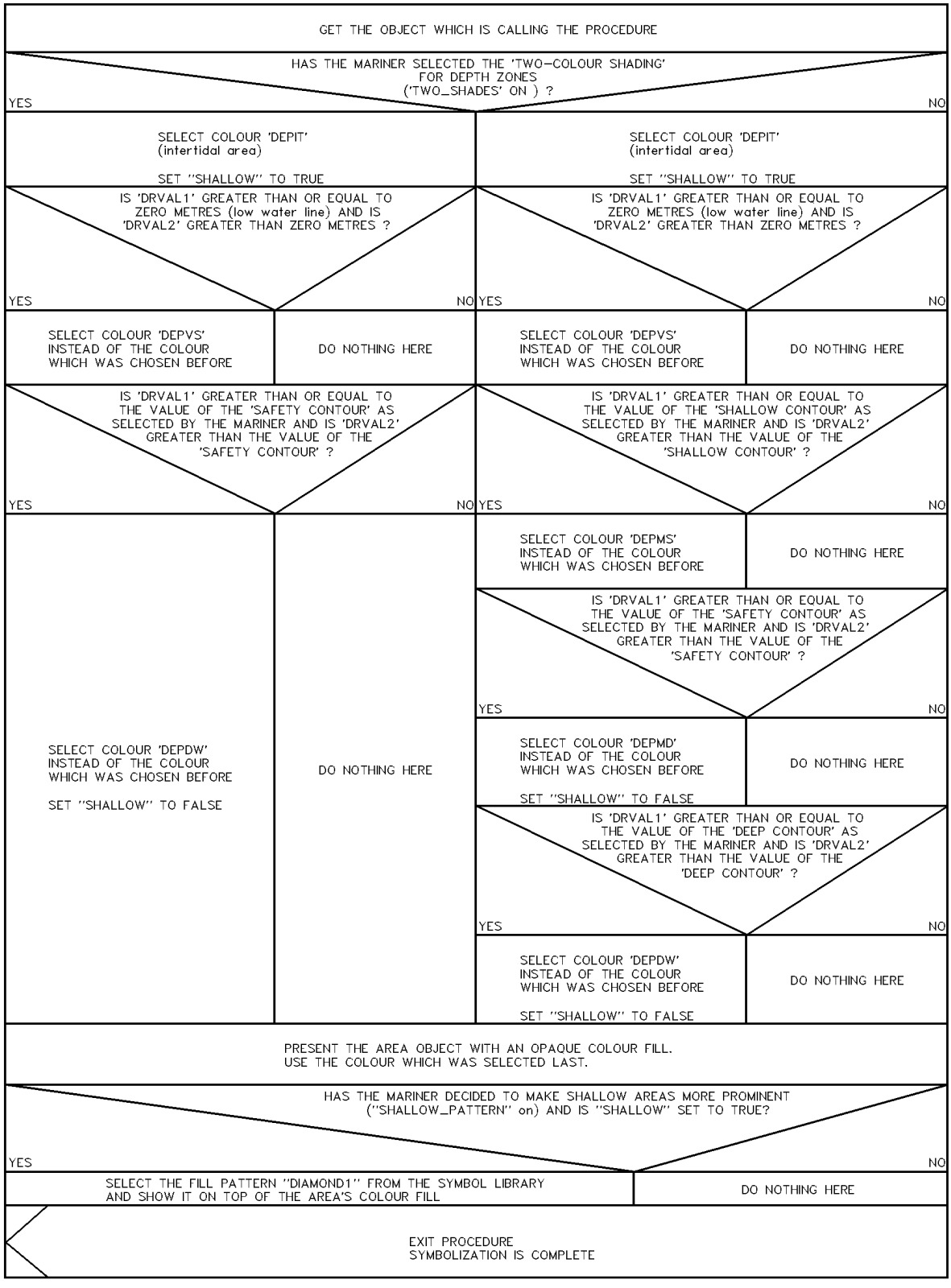

RESCSP01 Continuation C
Fishing restricted or prohibited
DOES THE VALUE OF THE ATTRIBUTE 'RESTRN' INCLUDE
'9' (dredging prohibited) AND/OR
'10' (dredging restricted) AND/OR
'11' (diving prohibited) AND/OR
'12' (diving restricted) AND/OR
'13' (no wake area) ?
YES
NO
SELECT 'SY(FSHRES71)'
SELECT 'SY(FSHRES51)'
SHOW THE SELECTED SYMBOL IN THE CENTRE OF THE AREA
RETURN TO THE CALLING PROCEDURE

**12.2.19 Conditional Symbology Procedure 'SEABED01'**
(Note that this is a sub-procedure called by DEPARE01)

| | |
|---|---|
| Applies to: | Symbolization of areas that form the seabed |
| Spatial Object(s): | Area |
| Parameter(s): | DRVAL1 (minimum depth) passed from calling procedure<br>DRVAL2 (maximum depth) passed from calling procedure<br>SHALLOW_CONTOUR depth value selected by the mariner<br>SAFETY_CONTOUR depth value selected by the mariner<br>DEEP_CONTOUR depth value selected by the mariner<br>TWO_SHADES flag selected by the mariner<br>(TWO_SHADES 'on' draws 2 depth area colour shades, 'off' draws 4)<br>SHALLOW_PATTERN flag selected by the mariner («optional») |
| Required ECDIS startup values: | The manufacturer is responsible for setting the following initial values:<br>SHALLOW_CONTOUR = 2.0 [meter]<br>DEEP_CONTOUR = 30.0 [meter]<br>SAFETY_CONTOUR = 30.0 [meter]<br>TWO_SHADES = on<br>SHALLOW_PATTERN = off<br><br>These values should stay in operation until the mariner decides to select other parameters. |
| Remarks: | An area object that is part of the seabed is coloured as necessary according to the mariners selection of two shades, (shallow contour, safety contour, deep contour), or four shades (safety contour only). This requires a decision making process provided by this conditional symbology procedure. Note that this procedure is called as a sub-procedure by other conditional symbology procedures.<br><br>Note: The requirement to show four depth shades is not mandatory. Also, the requirement to show the shallow pattern is not mandatory. However, both these features are strongly recommended. |

# SEABED01 (DRVAL1, DRVAL2)

Conditional symbology procedure for symbolization of areas that form the seabed.
Please note that this procedure is called by other procedures.



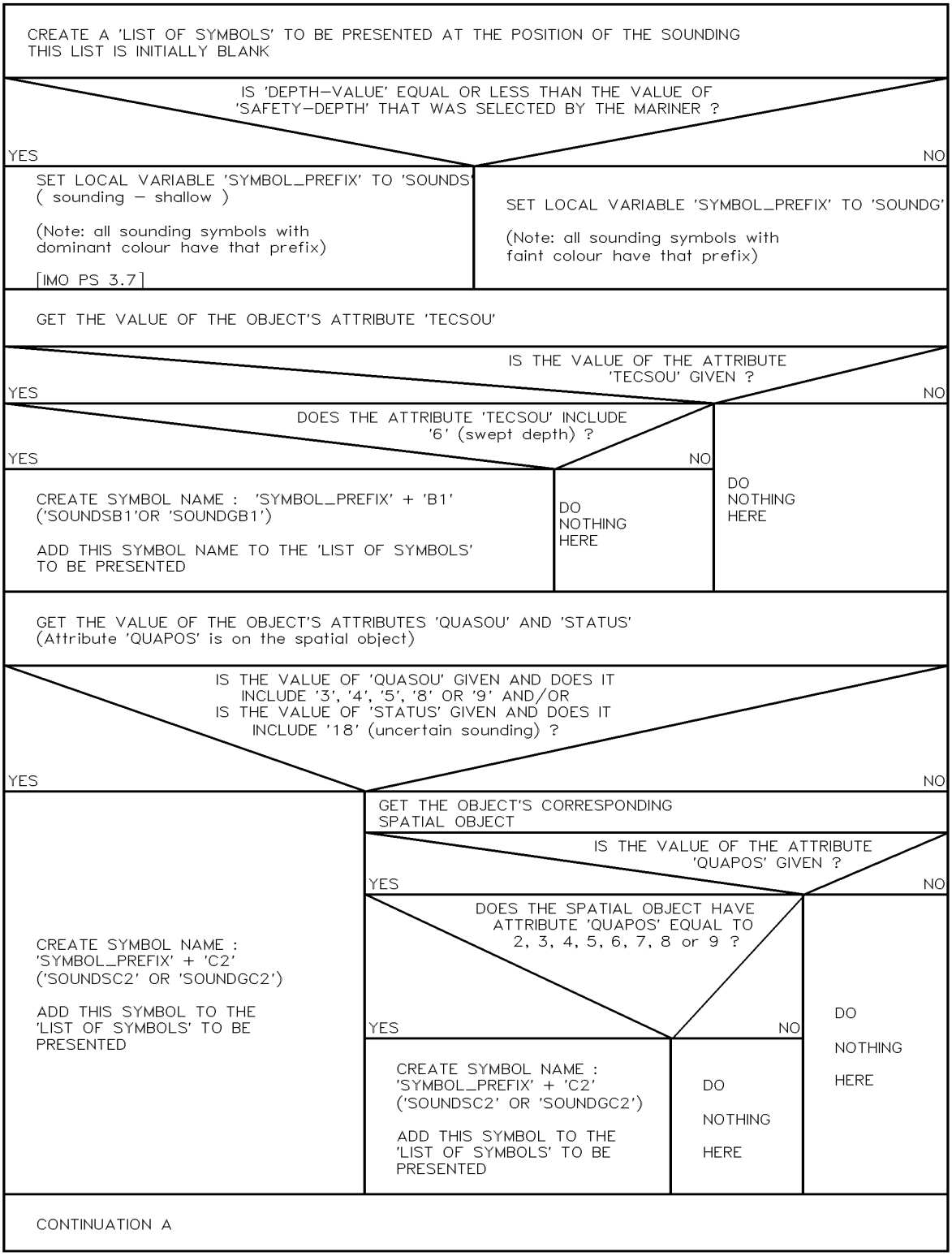
### 12.2.20 Conditional Symbology Procedure 'SNDFRM02'

(Note that this is a sub-procedure called by SOUNDG02, OBSTRN04, and WRECKS02)

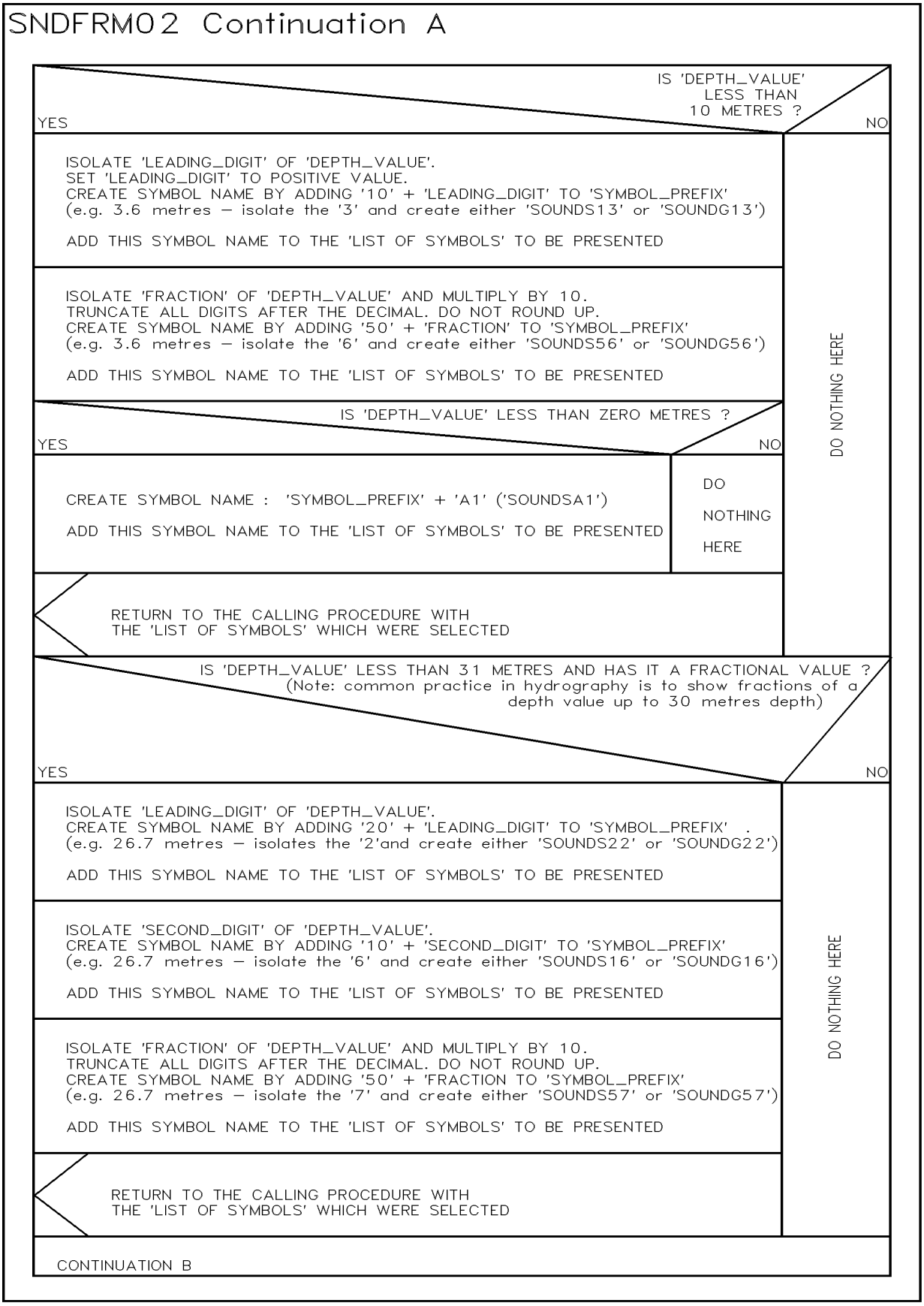
| | |
|---|---|
| Applies to: | Symbolization of depth values |
| Spatial Object(s): | Point |
| Parameter(s): | DEPTH_VALUE passed from calling procedure<br>SAFETY_DEPTH selected by the mariner |
| Required ECDIS startup values: | The manufacturer is responsible for setting the SAFETY_DEPTH to 30 meters (see also conditional symbology procedures "DEPARE01" and "DEPCNT02"). This value should stay in operation until the mariner decides to select another safety depth. |
| Remarks: | Soundings differ from plain text because they have to be readable under all circumstances and their digits are placed according to special rules. This conditional symbology procedure accesses a set of carefully designed sounding symbols provided by the symbol library and composes them to sounding labels. It symbolizes swept depth and it also symbolizes for low reliability as indicated by attributes QUASOU and QUAPOS. |

# SNDFRM02 (DEPTH-VALUE)

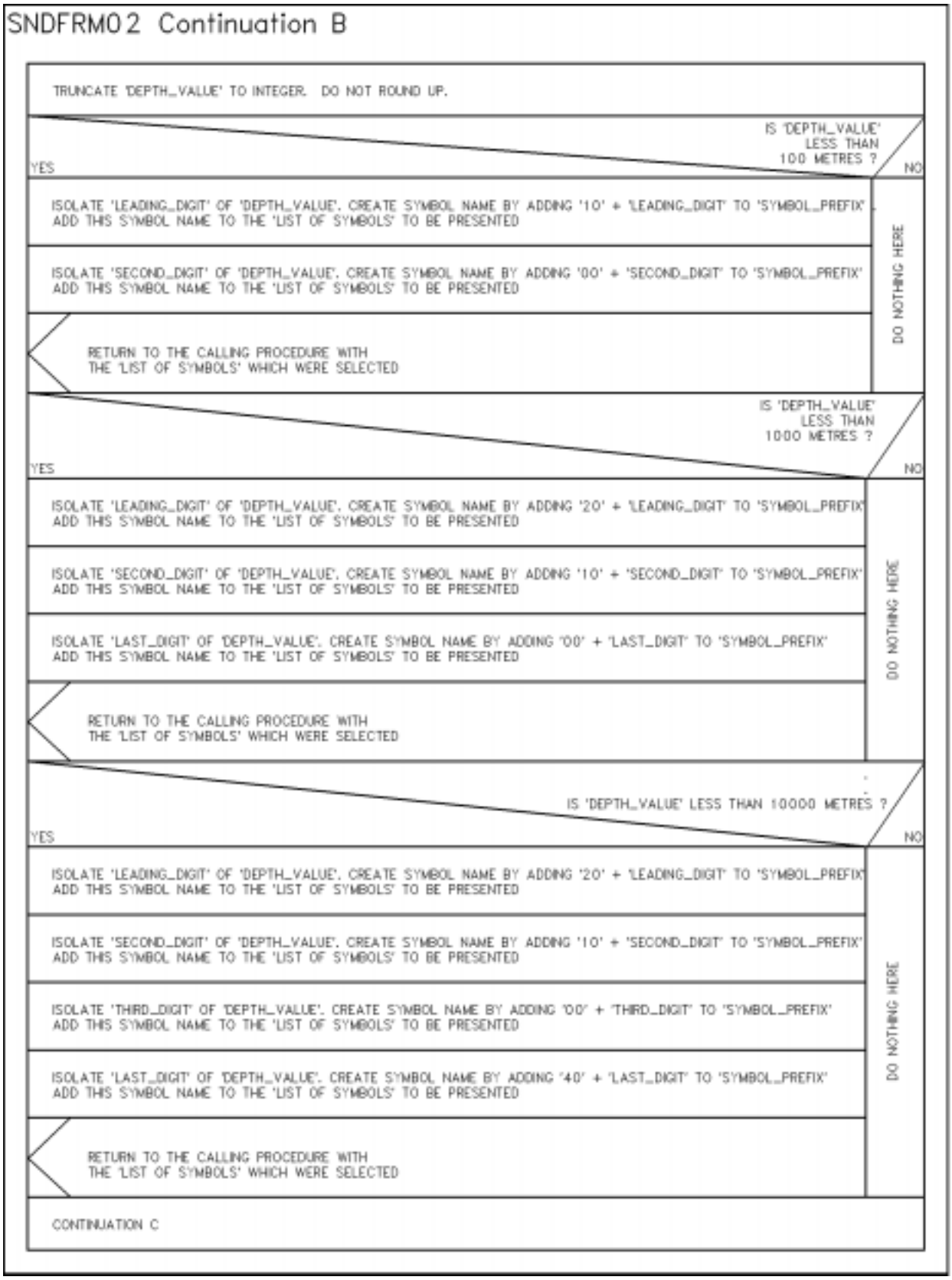
Conditional symbology procedure for symbolizing of depth values.
Please note that this symbology procedure is called by other procedures.
'DEPTH-VALUE' is passed on to this procedure by the calling procedure.

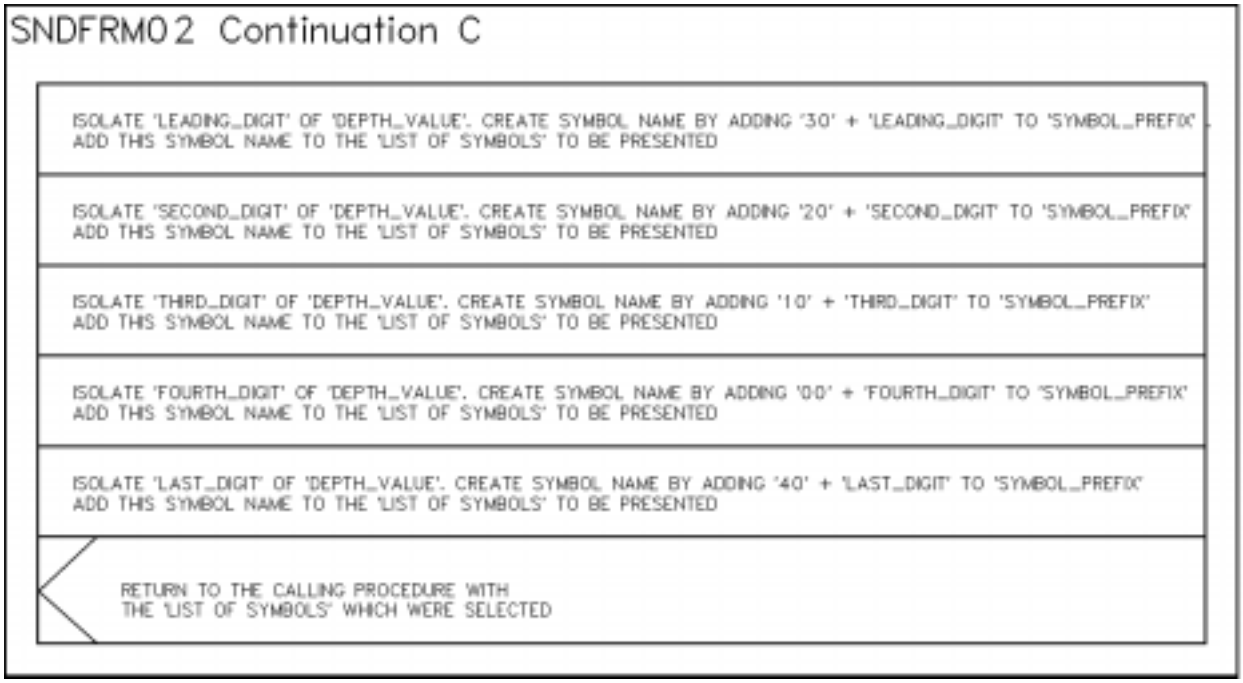


# SNDFRM02 Continuation A



# SNDFRM02 Continuation B




SNDFRM02 Continuation C
ISOLATE 'LEADING_DIGIT' OF 'DEPTH_VALUE'. CREATE SYMBOL NAME BY ADDING '30' + 'LEADING_DIGIT' TO 'SYMBOL_PREFIX'.
ADD THIS SYMBOL NAME TO THE 'LIST OF SYMBOLS' TO BE PRESENTED
ISOLATE 'SECOND_DIGIT' OF 'DEPTH_VALUE'. CREATE SYMBOL NAME BY ADDING '20' + 'SECOND_DIGIT' TO 'SYMBOL_PREFIX'
ADD THIS SYMBOL NAME TO THE 'LIST OF SYMBOLS' TO BE PRESENTED
ISOLATE 'THIRD_DIGIT' OF 'DEPTH_VALUE'. CREATE SYMBOL NAME BY ADDING '10' + 'THIRD_DIGIT' TO 'SYMBOL_PREFIX'
ADD THIS SYMBOL NAME TO THE 'LIST OF SYMBOLS' TO BE PRESENTED
ISOLATE 'FOURTH_DIGIT' OF 'DEPTH_VALUE'. CREATE SYMBOL NAME BY ADDING '00' + 'FOURTH_DIGIT' TO 'SYMBOL_PREFIX'
ADD THIS SYMBOL NAME TO THE 'LIST OF SYMBOLS' TO BE PRESENTED
ISOLATE 'LAST_DIGIT' OF 'DEPTH_VALUE'. CREATE SYMBOL NAME BY ADDING '40' + 'LAST_DIGIT' TO 'SYMBOL_PREFIX'
ADD THIS SYMBOL NAME TO THE 'LIST OF SYMBOLS' TO BE PRESENTED
RETURN TO THE CALLING PROCEDURE WITH
THE 'LIST OF SYMBOLS' WHICH WERE SELECTED

### 12.2.21 Conditional Symbology Procedure 'SOUNDG02'

| | |
|---|---|
| Applies to: | S-57 Object Class "soundings" (SOUNDG) |
| Spatial Object(s): | Point |
| Attribute(s) used: | depth values from sounding array |
| Parameter(s): | Object to be symbolized from SENC |
| Defaults: | Display Priority given by look-up table<br>OVERRADAR priority given by look-up table<br>Display Category given by look-up table<br>Viewing group given by look-up table |
| Remarks: | In S-57 soundings are elements of sounding arrays rather than individual objects. Thus this conditional symbology procedure examines each sounding of a sounding array one by one. To symbolize the depth values it calls the procedure SNDFRM02 which in turn translates the depth values into a set of symbols to be shown at the soundings position. |

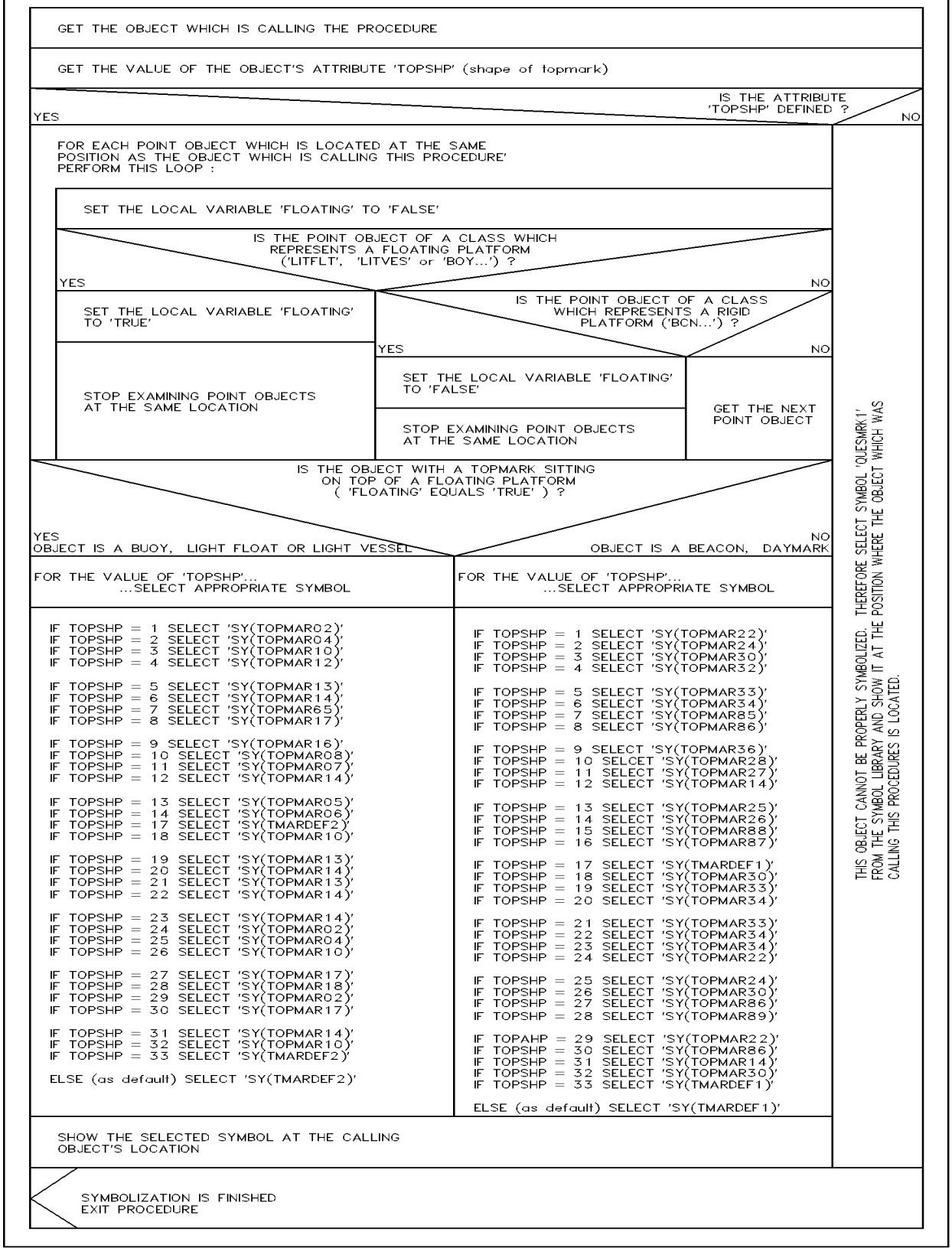
SOUNDG02
Conditional symbology procedure for symbolization of objects of the class 'SOUNDG' (sounding)
GET THE OBJECT WHICH IS CALLING THIS PROCEDURE
FOR EACH SOUNDING THAT IS PART OF THE OBJECT'S SOUNDING ARRAY, PERFORM THIS LOOP :
GET THE DEPTH VALUE OF THE SOUNDING THAT IS CURRENTLY EXAMINED.
SNDFRM02 (DEPTH_VALUE)
PERFORM THE SYMBOLOGY PROCEDURE 'SNDFRM02' TO SYMBOLIZE THE DEPTH VALUE.
PASS THE DEPTH VALUE ON TO 'SNDFRM02'.
A LIST OF SYMBOLS IS RETURNED.
[IMO PS 3.7]
SHOW THE SYMBOLS WHICH WERE SELECTED BY 'SNDFRM02'.
PLACE THEM AT THE POSITION WHICH IS GIVEN BY THE CURRENTLY EXAMINED SOUNDING.
SYMBOLIZATION IS FINISHED
EXIT PROCEDURE

### 12.2.22 Conditional Symbology Procedure 'TOPMAR01'

| | |
|---|---|
| Applies to: | S-57 Object Class "top mark" (TOPMAR) |
| Spatial Object(s): | Point |
| Relation(s) used: | Point objects at identical location |
| Attribute(s) used: | "shape of topmark" (TOPSHP) |
| Parameter(s): | Object to be symbolized from SENC |
| Defaults: | Display Priority given by look-up table<br>OVERRADAR priority given by look-up table<br>Display Category given by look-up table<br>Viewing Group given by look-up table |
| Remarks: | Topmark objects are to be symbolized through consideration of their platforms e.g. a buoy. Therefore this conditional symbology procedure searches for platforms by looking for other objects that are located at the same position.. Based on the finding whether the platform is rigid or floating, the respective upright or sloping symbol is selected and presented at the objects location. Buoy symbols and topmark symbols have been carefully designed to fit to each other when combined at the same position. The result is a composed symbol that looks like the traditional symbols the mariner is used to. |

# TOPMARO 1

Conditional symbology procedure for symbolization of objects of the class 'TOPMAR' ( topmarks ).



### 12.2.23 Conditional Symbology Procedure 'UDWHAZ03'

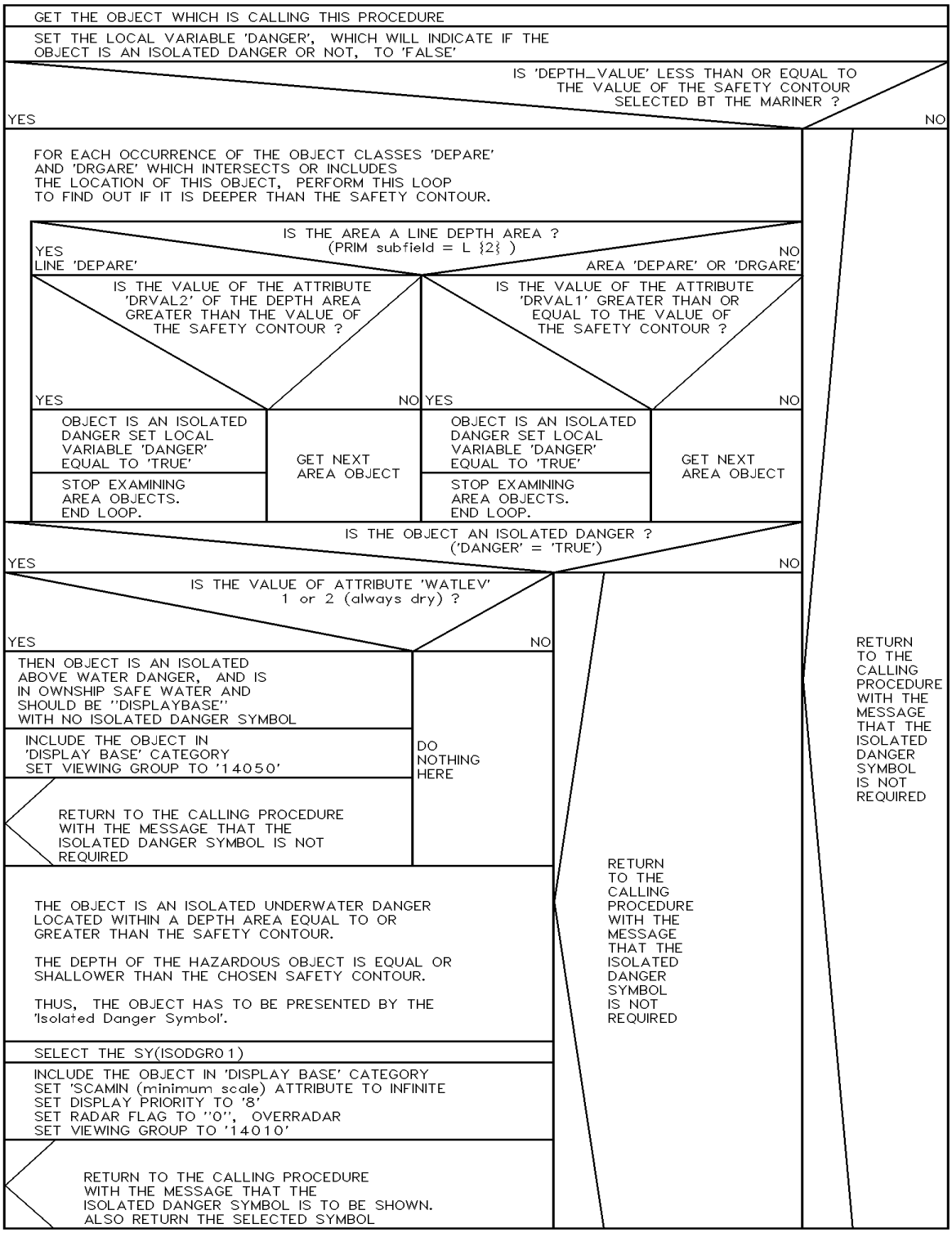
(Note that this is called as a sub-procedure called by OBSTRN04 and WRECKS02)

| | |
|---|---|
| Applies to: | Underwater hazards of all kinds |
| Spatial Object(s): | Point, Area |
| Relation(s) used: | adjacency of areas<br>location of point objects within areas<br>intersection of «depth area» (DEPARE) line primitive objects |
| Attribute(s) used: | "depth range value1" (DRVAL1)<br>«depth range value2» (DRVAL2) |
| Parameter(s): | Object to be symbolized from SENC<br>SAFETY_CONTOUR depth value selected by the mariner<br>DEPTH_VALUE passed in by calling procedure |
| Defaults: | Display Priority given by look-up table<br>OVERRADAR priority given by look-up table<br>Display Category given by look-up table<br>Viewing Group given by look-up table |
| Required ECDIS startup values: | The manufacturer is responsible for setting the SAFETY_CONTOUR to 30 meters (see also conditional symbology procedure "DEPARE01"). This value should stay in operation until the mariner decides to select another safety contour. |
| Remarks: | Obstructions or isolated underwater dangers of depths less than the safety contour which lie within the safe waters defined by the safety contour are to be presented by a specific isolated danger symbol as hazardous objects and put in IMO category DISPLAYBASE (see (3), App.2, 1.3). This task is performed by this conditional symbology procedure. |

# UDWHAZ03

Conditional symbology procedure for symbolization of 'isolated dangers'.
Please note, that this symbology procedure is called by other procedures (obstruction and wrecks) which handle the symbolization of obstructions located on the seabed.

This procedure is expecting the calling procedure to pass the local variable 'DEPTH_VALUE'.



### 12.2.24 Conditional Symbology Procedure 'VESSEL01'

| | | |
|---|---|---|
| Applies to: | Mariners' Navigational Object Class "vessel other than own-ship" (vessel) | |
| Spatial Object(s): | Point | |
| Attribute(s) used: | course over ground | (cogcrs) |
| | course through water | (ctwcrs) |
| | speed over ground | (sogspd) |
| | speed through water | (stwspd) |
| | heading | (headng) |
| | vessel report source | (vesrce) |
| | vessel status | (vestat) |
| | vector length time-period | (vecper) |
| | vector stabilization | (vecstb) |
| | vector time-mark interval | (vecmrk) |
| Parameter(s): | Object to be symbolized from SENC<br>Object's position, course and speed, heading<br>Options selected by mariner | |
| Defaults: | Display Priority given by look-up table<br>OVERRADAR priority given by look-up table<br>Display Category given by look-up table<br>Viewing Group given by look-up table | |

Remarks: The mariner should be prompted to select from the following options:
- ARPA target or AIS report (overall decision or vessel by vessel) (vesrce)
- *time-period determining vector-length for all vectors (vecper)
- whether to show a vector (overall or vessel by vessel) (vestat)
- *whether to symbolize vector stabilization (vecstb)
- * whether to show one-minute or six-minute vector time marks (vecmrk)
- whether to show heading line on AIS vessel reports (headng)

* Note that the same vector parameters should be used for own-ship and all vessel vectors.

Reference: IEC 1174, Annex E, Sections 3, 11 & 12

**VESSEL01**

Conditional symbology procedure for symbolizing «other vessels» than own-ship, and for drawing the associated vectors and heading lines.

The «other vessel» is symbolized in a manner depending on which of several options is selected by the mariner:

**1. Option to show vessel symbol only:**

1.1 ARPA target selected (vessel, vesrce1): show SY (ARPATG01) at the position indicated.

1.2 AIS report selected (vessel, vesrce2, vestat2, headng): show SY (AISSLP01) «sleeping AIS report» at the position indicated and rotate the symbol in the direction given by (headng). If heading is unknown, use SY(AISDEF01).

**2. Option to show course and speed vector as well as the vessel symbol**

(Note that the time period which determines vector length must be the same for all vectors.)

2.1 ARPA vector selected (vessel, vsrcel, vecper,...): Show SY(ARPATG01) at the position indicated. Starting at the pivot point of the vessel symbol draw a line scaled by the vector period (vecper) and speed (sogspd or stwspd) in the direction given by the course (cogcrs or ctwcrs). Linestyle is LS(SOLD,2,ARPAT).

2.2 AIS vector selected (vessel, vsrce2, vestat1, vecper,...): Show SY(AISVES01) «active AIS report» for the vessel, rotated in the direction given by (headng), at the position indicated. If 'headng' is not given, rotate symbol in direction of the course. Draw the same vector as for an ARPA target but leave a gap in the line the size of SY(AISONE01) at every minute mark point to avoid filling in that symbol. (If time marks are not selected, do not leave gaps.)

**3. Option to draw vector stabilization**

3.1 For ground stabilization (vessel, vecstb1,...): place SY(VECGND21) at the end of the vector. Rotate the symbol in the direction given by (cogcrs).

3.2 For water stabilization (vessel, vecstb2,...): place SY(VECWTR21) at the end of the vector. Rotate the symbol in the direction given by (ctwcrs).

**4. Option to show time marks on vector**

4.1 ARPA target selected (vessel, vsrcel,...):

4.1.A One-minute marks selected (vessel, vsrcel, vecmrk1,... ): place SY(ARPSIX01) at every sixth minute mark, and SY(ARPONE01) at every remaining one-minute mark. Rotate all symbols in the direction given by (cogcrs or ctwcrs).

4.1.B Only six-minute marks selected (vessel, vecmrk2,... ): place SY(ARPSIX01) at every six-minute mark. Rotate in the direction given by (cogcrs or ctwcrs).

4.2 AIS report selected(vessel, vesrce2, vecstat1,...):

4.2.A One-minute marks selected (vessel, vesrce2, vecmrk1,... ): place SY(AISSIX01) at every sixth minute mark, and SY(AISONE01) at every remaining one-minute mark. Rotate all symbols in the direction given by (cogcrs or ctwcrs).

4.2.B Only six-minute marks selected (vessel, vesrce2, vecmrk2,... ): place SY(AISSIX01) at every sixth minute mark. Rotate all symbols in the direction given by (cogcrs or ctwcrs). Re-draw the vector, leaving gaps for SY(AISSIX01) at the sixth minute marks only. (i.e. fill the gaps left for SY(AISONE01)

**5. Option to show heading line (only applies to AIS reports)**

5.1 For AIS reports only, (vessel, vesrce2,...) draw a line 50mm in length, starting at the vessel symbol pivot point, in the direction given by (headng). Linestyle is LS(SOLD,1,ARPAT).

### 12.2.25 Conditional Symbology Procedure 'VRMEBL01'

| | |
|---|---|
| Applies to: | Mariners' Navigational Object Class "variable range mark " (vrmark)<br>Mariners' Navigational Object Class «electronic bearing line» (ebline). |
| Spatial Object(s): | Line |
| Attribute(s) used: | none |
| Parameter(s): | Object to be symbolized from SENC<br>Options selected by mariner |
| Defaults: | Display Priority given by look-up table<br>OVERRADAR priority given by look-up table<br>Display Category given by look-up table<br>Viewing Group given by look-up table |
| Remarks: | This conditional symbology procedure symbolizes the three cases of range circle, bearing line and range/bearing line. VRM's and EBL's can be ship-centred or freely movable, and two line-styles are available |
| Reference: | EC 1174, Annex E, Section 4 |

**VRMEBL01**

Conditional symbology procedure to symbolize VRM's and EBL's.

The three features under the general heading of VRM/EBL are drawn as follows:

**1. Variable Range Marker (VRM):**

1.1 The VRM may be either:

1.1.1 Centred on own-ship, or

1.1.2 Freely movable, with centre-point marked by SY(EBLVRM11).

1.2.1 Draw the circle either at a range in nautical miles (NM) selected by the mariner, or at a radius set interactively by the mariner, with a range read-out on the interface

1.2.2 The linestyle should be either:
«A» LC(ERBLNA01), or
«B» LC(ERBLNB01), as selected by the mariner.

**2. Electronic Bearing Line**

2.1 The EBL may be either:

2.1.1 Originating at own-ship, or

2.1.2 Freely movable with point of origin marked by SY(EBLVRM11).

2.2.1 Draw the line either at a bearing in degrees from true north selected by the mariner, or in a direction set interactively by the mariner, with a read-out of the bearing on the interface. Draw to the edge of the display, or to a range selected by the mariner.

2.2.2 The linestyle should be either:
«A» LC(ERBLNA01), or
«B» LC(ERBLNB01) as selected by the mariner.

**3. Electronic Range and Bearing Line**

3.1 The ERBL may be either:

3.1.1 Originating at own-ship, or

3.1.2 Freely movable with point of origin marked by SY(EBLVRM11).

3.2.1 Draw the bearing line either at a bearing in degrees from true north selected by the mariner, or in a direction set interactively by the mariner, with a read-out of the bearing on the interface. Draw to the edge of the display, or to a range selected by the mariner.

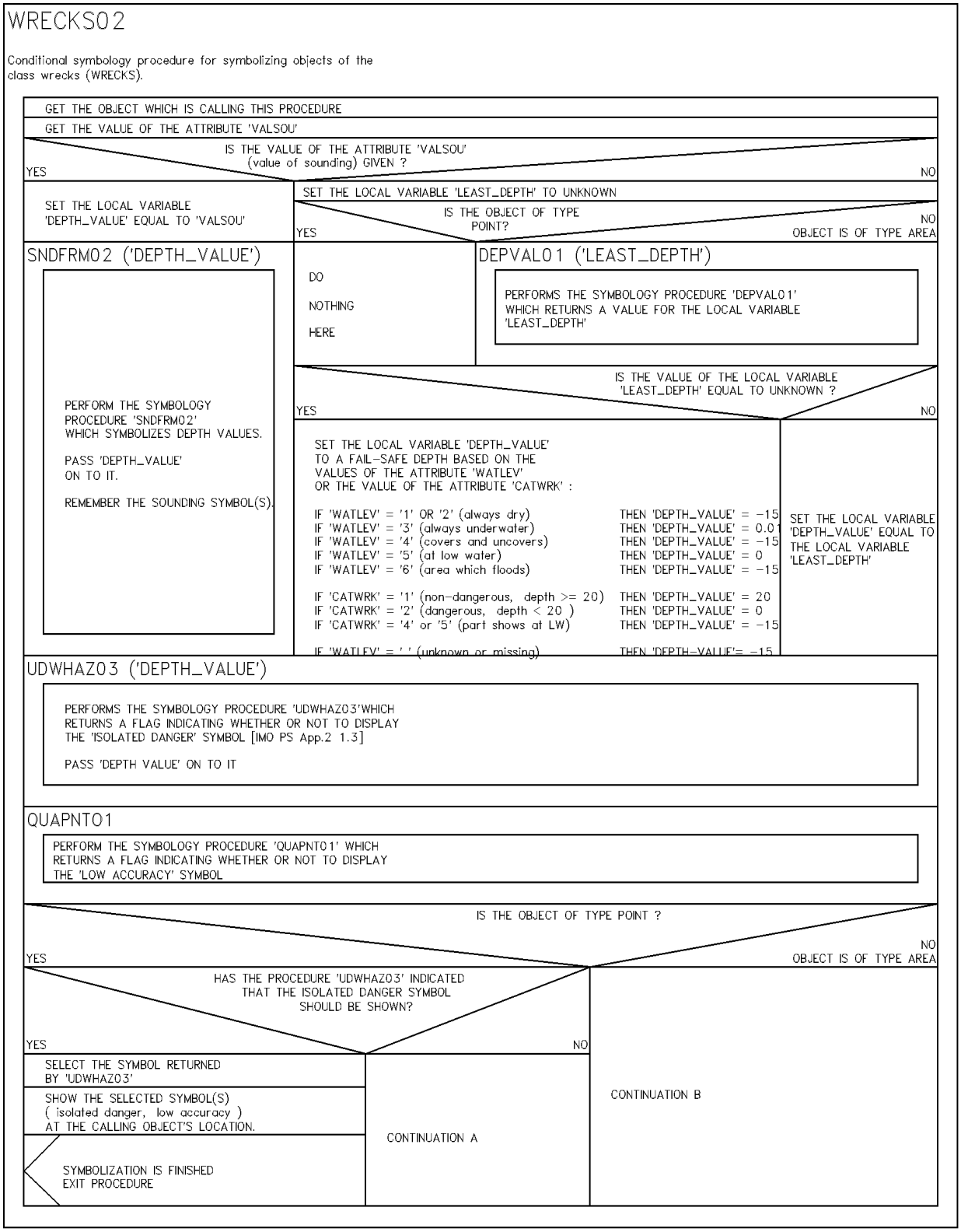
3.2.2 The linestyle should be either:
«A» LC(ERBLNA01), or
«B» LC(ERBLNB01) as selected by the mariner.

3.3.1 Place the range marker either at a range in nautical miles (NM) selected by the mariner, or at range set interactively by the mariner, with a read-out of the range on the interface.

3.3.2 Use SY(ERBLTIK1) to symbolize the range mark on the bearing line. Rotate the symbol to the direction indicated by the bearing line.

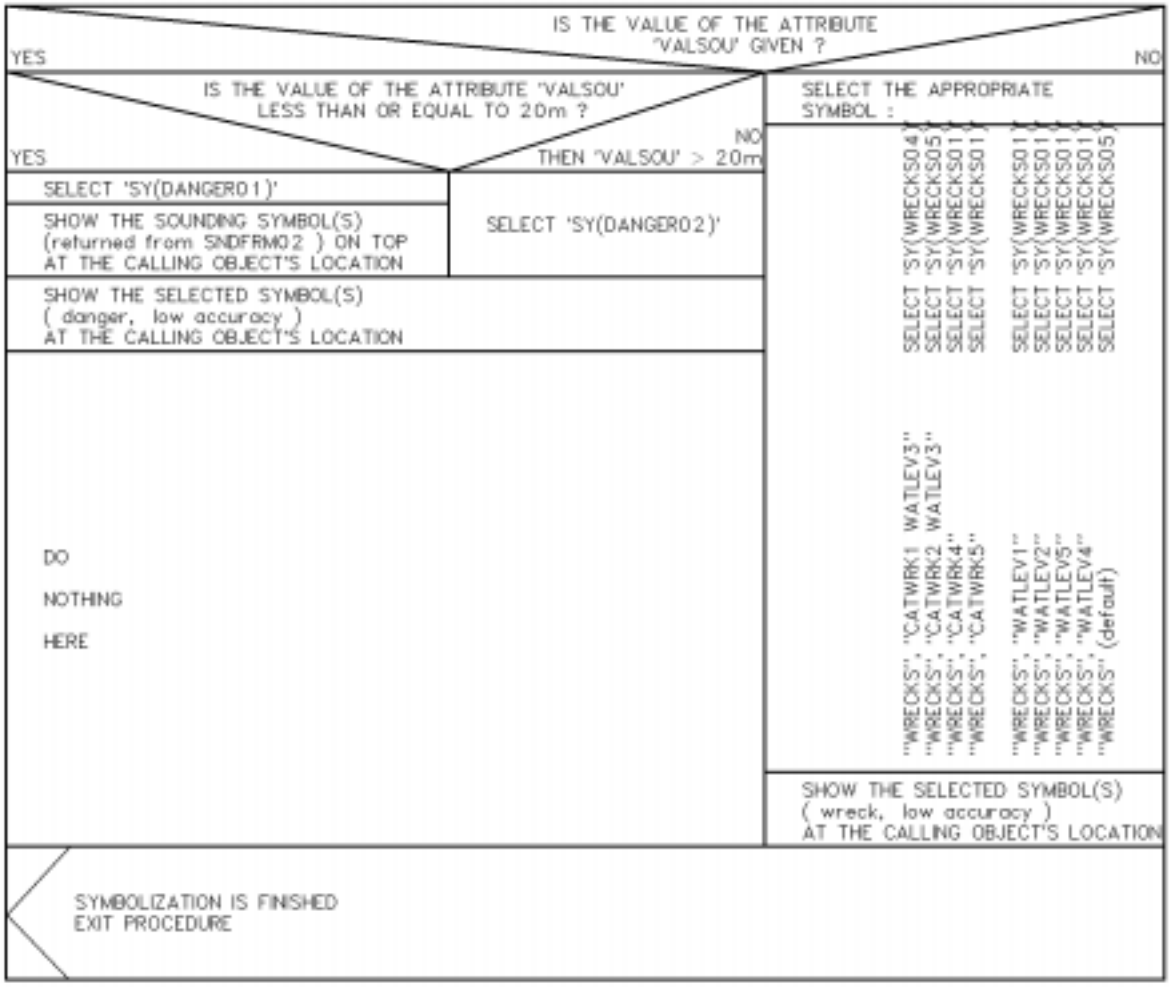
### 12.2.26 Conditional Symbology Procedure ’WRECKS02’

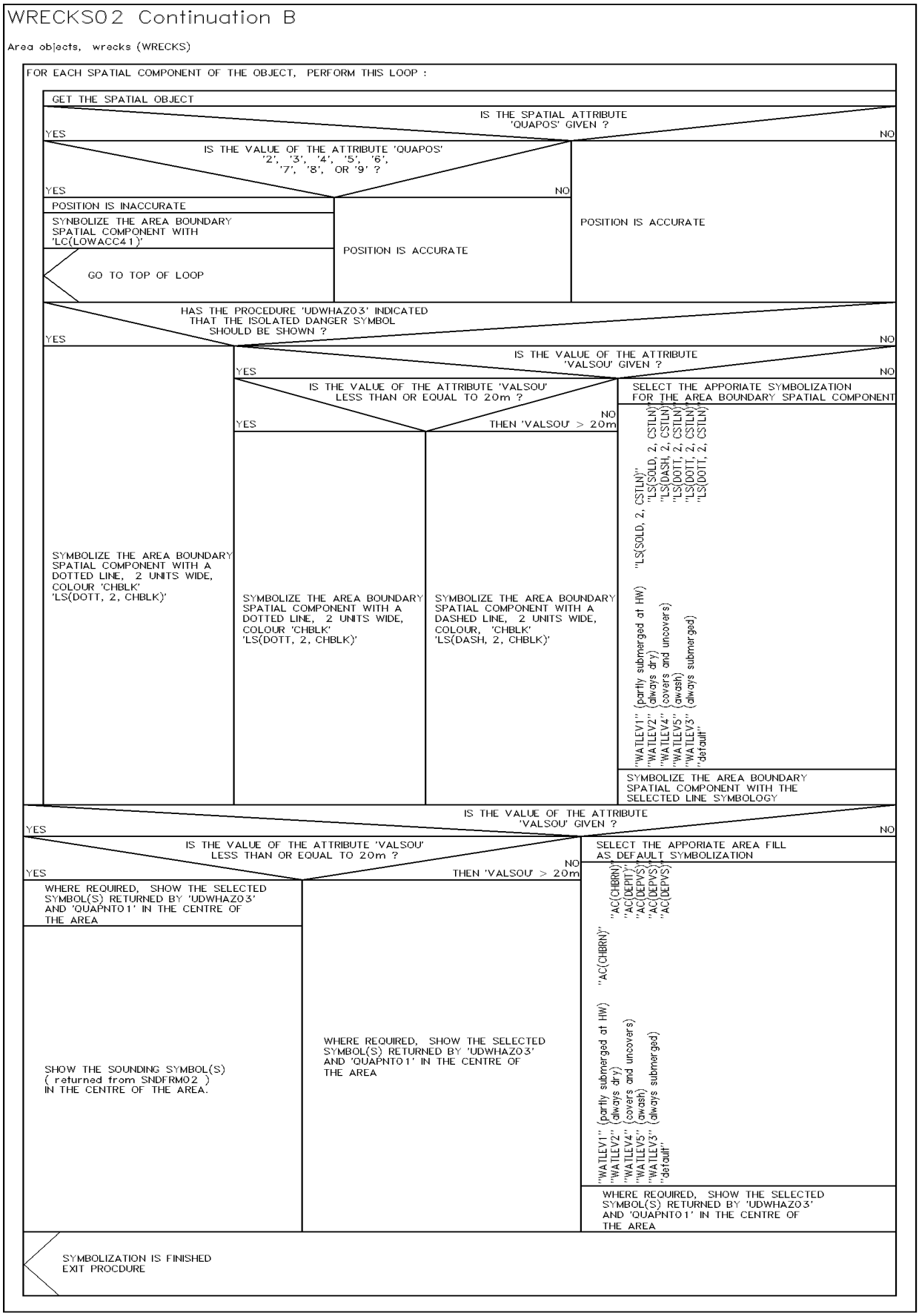
| | |
|---|---|
| Applies to: | S-57 Object Class "wrecks" (WRECKS) |
| Spatial Object(s): | Point, Area |
| Attribute(s) used: | "value of sounding" (VALSOU)<br>"category of wreck" (CATWRK)<br>«water level» (WATLEV) |
| Parameter(s): | Object to be symbolized from SENC |
| Defaults: | Display Priority given by look-up table<br>OVERRADAR priority given by look-up table<br>Display Category given by look-up table<br>Viewing Group given by look-up table<br>Area colour fill from underlying DEPARE or UNSARE |
| Remarks: | Wrecks of depths less than the safety contour which lie within the safe waters defined by the safety contour are to be presented by a specific isolated danger symbol and put in IMO category DISPLAYBASE (see (3), App.2, 1.3). This task is performed by the sub-procedure "UDWHAZ03" which is called by this symbology procedure. |


WRECKS02
Conditional symbology procedure for symbolizing objects of the class wrecks (WRECKS).
GET THE OBJECT WHICH IS CALLING THIS PROCEDURE
GET THE VALUE OF THE ATTRIBUTE 'VALSOU'
IS THE VALUE OF THE ATTRIBUTE 'VALSOU' (value of sounding) GIVEN ?
YES
NO
SET THE LOCAL VARIABLE 'DEPTH_VALUE' EQUAL TO 'VALSOU'
SET THE LOCAL VARIABLE 'LEAST_DEPTH' TO UNKNOWN
IS THE OBJECT OF TYPE POINT?
YES
NO
OBJECT IS OF TYPE AREA
SNDFRM02 ('DEPTH_VALUE')
PERFORM THE SYMBOLOGY PROCEDURE 'SNDFRM02' WHICH SYMBOLIZES DEPTH VALUES.
PASS 'DEPTH_VALUE' ON TO IT.
REMEMBER THE SOUNDING SYMBOL(S).
DO
NOTHING
HERE
DEPVAL01 ('LEAST_DEPTH')
PERFORMS THE SYMBOLOGY PROCEDURE 'DEPVAL01' WHICH RETURNS A VALUE FOR THE LOCAL VARIABLE 'LEAST_DEPTH'
IS THE VALUE OF THE LOCAL VARIABLE 'LEAST_DEPTH' EQUAL TO UNKNOWN ?
YES
NO
SET THE LOCAL VARIABLE 'DEPTH_VALUE' TO A FAIL-SAFE DEPTH BASED ON THE VALUES OF THE ATTRIBUTE 'WATLEV' OR THE VALUE OF THE ATTRIBUTE 'CATWRK' :
IF 'WATLEV' = '1' OR '2' (always dry) THEN 'DEPTH_VALUE' = -15
IF 'WATLEV' = '3' (always underwater) THEN 'DEPTH_VALUE' = 0.01
IF 'WATLEV' = '4' (covers and uncovers) THEN 'DEPTH_VALUE' = -15
IF 'WATLEV' = '5' (at low water) THEN 'DEPTH_VALUE' = 0
IF 'WATLEV' = '6' (area which floods) THEN 'DEPTH_VALUE' = -15
IF 'CATWRK' = '1' (non-dangerous, depth >= 20) THEN 'DEPTH_VALUE' = 20
IF 'CATWRK' = '2' (dangerous, depth < 20 ) THEN 'DEPTH_VALUE' = 0
IF 'CATWRK' = '4' or '5' (part shows at LW) THEN 'DEPTH_VALUE' = -15
IF 'WATLEV' = ' ' (unknown or missing) THEN 'DEPTH_VALUE' = -15
SET THE LOCAL VARIABLE 'DEPTH_VALUE' EQUAL TO THE LOCAL VARIABLE 'LEAST_DEPTH'
UDWHAZ03 ('DEPTH_VALUE')
PERFORMS THE SYMBOLOGY PROCEDURE 'UDWHAZ03'WHICH RETURNS A FLAG INDICATING WHETHER OR NOT TO DISPLAY THE 'ISOLATED DANGER' SYMBOL [IMO PS App.2 1.3]
PASS 'DEPTH VALUE' ON TO IT
QUAPNT01
PERFORM THE SYMBOLOGY PROCEDURE 'QUAPNT01' WHICH RETURNS A FLAG INDICATING WHETHER OR NOT TO DISPLAY THE 'LOW ACCURACY' SYMBOL
IS THE OBJECT OF TYPE POINT ?
YES
NO
OBJECT IS OF TYPE AREA
HAS THE PROCEDURE 'UDWHAZ03' INDICATED THAT THE ISOLATED DANGER SYMBOL SHOULD BE SHOWN?
YES
NO
SELECT THE SYMBOL RETURNED BY 'UDWHAZ03'
SHOW THE SELECTED SYMBOL(S) ( isolated danger, low accuracy ) AT THE CALLING OBJECT'S LOCATION.
SYMBOLIZATION IS FINISHED
EXIT PROCEDURE
CONTINUATION A
CONTINUATION B

# WRECKS02 Continuation A

Point objects, wrecks (WRECKS)




WRECKS02 Continuation B
Area objects, wrecks (WRECKS)
FOR EACH SPATIAL COMPONENT OF THE OBJECT, PERFORM THIS LOOP :
GET THE SPATIAL OBJECT
IS THE SPATIAL ATTRIBUTE 'QUAPOS' GIVEN ?
YES
NO
IS THE VALUE OF THE ATTRIBUTE 'QUAPOS' '2', '3', '4', '5', '6', '7', '8', OR '9' ?
YES
NO
POSITION IS INACCURATE
SYNBOLIZE THE AREA BOUNDARY SPATIAL COMPONENT WITH 'LC(LOWACC41)'
GO TO TOP OF LOOP
POSITION IS ACCURATE
POSITION IS ACCURATE
HAS THE PROCEDURE 'UDWHAZ03' INDICATED THAT THE ISOLATED DANGER SYMBOL SHOULD BE SHOWN ?
YES
NO
SYMBOLIZE THE AREA BOUNDARY SPATIAL COMPONENT WITH A DOTTED LINE, 2 UNITS WIDE, COLOUR 'CHBLK' 'LS(DOTT, 2, CHBLK)'
IS THE VALUE OF THE ATTRIBUTE 'VALSOU' GIVEN ?
YES
NO
IS THE VALUE OF THE ATTRIBUTE 'VALSOU' LESS THAN OR EQUAL TO 20m ?
YES
NO
THEN 'VALSOU' > 20m
SYMBOLIZE THE AREA BOUNDARY SPATIAL COMPONENT WITH A DOTTED LINE, 2 UNITS WIDE, COLOUR 'CHBLK' 'LS(DOTT, 2, CHBLK)'
SYMBOLIZE THE AREA BOUNDARY SPATIAL COMPONENT WITH A DASHED LINE, 2 UNITS WIDE, COLOUR, 'CHBLK' 'LS(DASH, 2, CHBLK)'
SELECT THE APPORIATE SYMBOLIZATION FOR THE AREA BOUNDARY SPATIAL COMPONENT
"LS(SOLD, 2, CSTLN)"
"WATLEV1" (partly submerged at HW) "LS(SOLD, 2, CSTLN)"
"WATLEV2" (always dry) "LS(DASH, 2, CSTLN)"
"WATLEV4" (covers and uncovers) "LS(DOTT, 2, CSTLN)"
"WATLEV5" (awash) "LS(DOTT, 2, CSTLN)"
"WATLEV3" (always submerged) "LS(DOTT, 2, CSTLN)"
"default"
SYMBOLIZE THE AREA BOUNDARY SPATIAL COMPONENT WITH THE SELECTED LINE SYMBOLOGY
IS THE VALUE OF THE ATTRIBUTE 'VALSOU' GIVEN ?
YES
NO
IS THE VALUE OF THE ATTRIBUTE 'VALSOU' LESS THAN OR EQUAL TO 20m ?
YES
NO
THEN 'VALSOU' > 20m
WHERE REQUIRED, SHOW THE SELECTED SYMBOL(S) RETURNED BY 'UDWHAZ03' AND 'QUAPNT01' IN THE CENTRE OF THE AREA
SHOW THE SOUNDING SYMBOL(S) ( returned from SNDFRM02 ) IN THE CENTRE OF THE AREA.
WHERE REQUIRED, SHOW THE SELECTED SYMBOL(S) RETURNED BY 'UDWHAZ03' AND 'QUAPNT01' IN THE CENTRE OF THE AREA
SELECT THE APPORIATE AREA FILL AS DEFAULT SYMBOLIZATION
"AC(CHBRN)"
"AC(CHBRN)" "AC(DEPIT)" "AC(DEPVS)" "AC(DEPVS)" "AC(DEPVS)"
"WATLEV1" (partly submerged at HW) "AC(CHBRN)"
"WATLEV2" (always dry) "AC(DEPIT)"
"WATLEV4" (covers and uncovers) "AC(DEPVS)"
"WATLEV5" (awash) "AC(DEPVS)"
"WATLEV3" (always submerged) "AC(DEPVS)"
"default"
WHERE REQUIRED, SHOW THE SELECTED SYMBOL(S) RETURNED BY 'UDWHAZ03' AND 'QUAPNT01' IN THE CENTRE OF THE AREA
SYMBOLIZATION IS FINISHED
EXIT PROCDURE

# 13. TABLES

## 13.1 Colour Tables

The following pages list the colour tables which were designed for different conditions of illumination on the bridge.

The colours are defined in CIE values. The ECDIS manufacturer is responsible for computing the correct RGB values for the monitor he uses, from CIE values, as described in annex B of appendix 2 to S-52 (5). A program for the conversion of CIE into RGB values is provided on the distribution CD-Rom (see section 19).

ECDIS manufacturers should refer to section 4 of the Provisional Colour and Symbol Specifications for details for the design and use of the colour tables. Please see also section 4 of this manual for further explanation of the colour scheme and use of colour token.

There are 63 colours in these tables. With the addition of the transparent colour (TRNSP) there are 64 colour tokens.

In the event of a discrepancy between the printed tables that follow and the digital version, the digital version should be used.

Colour Table: **DAY_BRIGHT**

| Token | Colour | X | Y | LUMINANCE |
|---|---|---|---|---|
| NODTA | grey | 0.2800 | 0.3100 | 45.000 |
| CURSR | orange | 0.5200 | 0.3900 | 28.000 |
| CHBLK | black | 0.2800 | 0.3100 | 0.000 |
| CHGRD | grey | 0.2800 | 0.3100 | 25.000 |
| CHGRF | grey | 0.2800 | 0.3100 | 45.000 |
| CHRED | red | 0.4800 | 0.3000 | 25.000 |
| CHGRN | green | 0.3000 | 0.5200 | 60.000 |
| CHYLW | yellow | 0.4100 | 0.4700 | 70.000 |
| CHMGD | magenta | 0.3000 | 0.1700 | 20.000 |
| CHMGF | magenta | 0.2800 | 0.2400 | 48.000 |
| CHBRN | brown | 0.4200 | 0.4500 | 30.000 |
| CHWHT | white | 0.2800 | 0.3100 | 80.000 |
| SCLBR | orange | 0.5200 | 0.3900 | 28.000 |
| CHCOR | orange | 0.5200 | 0.3900 | 28.000 |
| LITRD | red | 0.4800 | 0.3000 | 25.000 |
| LITGN | green | 0.3000 | 0.5200 | 60.000 |
| LITYW | yellow | 0.4100 | 0.4700 | 70.000 |
| ISDNG | magenta | 0.3000 | 0.1700 | 20.000 |
| DNGHL | red | 0.4800 | 0.3000 | 25.000 |
| TRFCD | magenta | 0.3000 | 0.1700 | 20.000 |
| TRFCF | magenta | 0.2800 | 0.2400 | 48.000 |
| LANDA | brown | 0.3600 | 0.4000 | 49.000 |
| LANDF | brown | 0.4500 | 0.4500 | 15.000 |
| CSTLN | grey | 0.2800 | 0.3100 | 10.000 |
| SNDG1 | grey | 0.2800 | 0.3100 | 25.000 |
| SNDG2 | black | 0.2800 | 0.3100 | 0.000 |
| DEPSC | grey | 0.2800 | 0.3100 | 10.000 |
| DEPCN | grey | 0.2800 | 0.3100 | 25.000 |
| DEPDW | white | 0.2800 | 0.3100 | 80.000 |
| DEPMD | pale_blue | 0.2700 | 0.3000 | 65.000 |
| DEPMS | light_blue | 0.2400 | 0.2600 | 55.000 |
| DEPVS | medium_blue | 0.2200 | 0.2400 | 45.000 |
| DEPIT | yellow-green | 0.2800 | 0.3600 | 40.000 |
| RADHI | green | 0.3000 | 0.5200 | 60.000 |
| RADLO | green | 0.3000 | 0.5200 | 20.000 |
| ARPAT | blue-green | 0.2600 | 0.4200 | 30.000 |
| NINFO | orange | 0.5200 | 0.3900 | 28.000 |
| RESBL | blue | 0.1800 | 0.1500 | 22.000 |
| ADINF | yellow | 0.4100 | 0.4700 | 35.000 |
| RESGR | grey | 0.2800 | 0.3100 | 25.000 |
| SHIPS | black | 0.2800 | 0.3100 | 0.000 |
| PSTRK | black | 0.2800 | 0.3100 | 0.000 |
| SYTRK | grey | 0.2800 | 0.3100 | 25.000 |
| PLRTE | red | 0.5800 | 0.3500 | 18.000 |
| APLRT | orange | 0.5200 | 0.3900 | 28.000 |
| UINFD | black | 0.2800 | 0.3100 | 0.000 |
| UINFF | grey | 0.2800 | 0.3100 | 25.000 |
| UIBCK | white | 0.2800 | 0.3100 | 80.000 |
| UIAFD | medium_blue | 0.2200 | 0.2400 | 45.000 |
| UINFR | red | 0.4800 | 0.3000 | 25.000 |
| UINFG | green | 0.3000 | 0.5200 | 60.000 |
| UINFO | orange | 0.5200 | 0.3900 | 28.000 |
| UINFB | blue | 0.1800 | 0.1500 | 22.000 |
| UINFM | magenta | 0.3000 | 0.1700 | 20.000 |
| UIBDR | grey | 0.2800 | 0.3100 | 25.000 |
| UIAFF | brown | 0.3600 | 0.4000 | 49.000 |
| OUTLW | black | 0.2800 | 0.3100 | 0.000 |
| OUTLL | brown | 0.3600 | 0.4000 | 49.000 |
| RES01 | grey | 0.2800 | 0.3100 | 45.000 |
| RES02 | grey | 0.2800 | 0.3100 | 45.000 |
| RES03 | grey | 0.2800 | 0.3100 | 45.000 |
| RES04 | grey | 0.2800 | 0.3100 | 45.000 |
| RES05 | grey | 0.2800 | 0.3100 | 45.000 |

Colour Table: **DAY_WHITEBACK**

| Token | Colour | X | Y | LUMINANCE |
|---|---|---|---|---|
| NODTA | grey | 0.2800 | 0.3100 | 31.500 |
| CURSR | orange | 0.5200 | 0.3900 | 19.600 |
| CHBLK | black | 0.2800 | 0.3100 | 0.000 |
| CHGRD | grey | 0.2800 | 0.3100 | 17.500 |
| CHGRF | grey | 0.2800 | 0.3100 | 31.500 |
| CHRED | red | 0.4800 | 0.3000 | 17.500 |
| CHGRN | green | 0.3000 | 0.5200 | 42.000 |
| CHYLW | yellow | 0.4100 | 0.4700 | 49.000 |
| CHMGD | magenta | 0.3000 | 0.1700 | 14.000 |
| CHMGF | magenta | 0.2800 | 0.2400 | 33.600 |
| CHBRN | brown | 0.4200 | 0.4500 | 21.000 |
| CHWHT | white | 0.2800 | 0.3100 | 56.000 |
| SCLBR | orange | 0.5200 | 0.3900 | 19.600 |
| CHCOR | orange | 0.5200 | 0.3900 | 19.600 |
| LITRD | red | 0.4800 | 0.3000 | 17.500 |
| LITGN | green | 0.3000 | 0.5200 | 42.000 |
| LITYW | yellow | 0.4100 | 0.4700 | 49.000 |
| ISDNG | magenta | 0.3000 | 0.1700 | 14.000 |
| DNGHL | red | 0.4800 | 0.3000 | 17.500 |
| TRFCD | magenta | 0.3000 | 0.1700 | 14.000 |
| TRFCF | magenta | 0.2800 | 0.2400 | 33.600 |
| LANDA | brown | 0.3600 | 0.4000 | 34.300 |
| LANDF | brown | 0.4500 | 0.4500 | 10.500 |
| CSTLN | grey | 0.2800 | 0.3100 | 7.000 |
| SNDG1 | grey | 0.2800 | 0.3100 | 17.500 |
| SNDG2 | black | 0.2800 | 0.3100 | 0.000 |
| DEPSC | grey | 0.2800 | 0.3100 | 7.000 |
| DEPCN | grey | 0.2800 | 0.3100 | 17.500 |
| DEPDW | white | 0.2800 | 0.3100 | 56.000 |
| DEPMD | pale_blue | 0.2700 | 0.3000 | 45.500 |
| DEPMS | light_blue | 0.2400 | 0.2600 | 38.500 |
| DEPVS | medium_blue | 0.2200 | 0.2400 | 31.500 |
| DEPIT | yellow-green | 0.2800 | 0.3600 | 28.000 |
| RADHI | green | 0.3000 | 0.5200 | 42.000 |
| RADLO | green | 0.3000 | 0.5200 | 14.000 |
| ARPAT | blue-green | 0.2600 | 0.4200 | 21.000 |
| NINFO | orange | 0.5200 | 0.3900 | 19.600 |
| RESBL | blue | 0.1800 | 0.1500 | 15.400 |
| ADINF | yellow | 0.4100 | 0.4700 | 24.500 |
| RESGR | grey | 0.2800 | 0.3100 | 17.500 |
| SHIPS | black | 0.2800 | 0.3100 | 0.000 |
| PSTRK | black | 0.2800 | 0.3100 | 0.000 |
| SYTRK | grey | 0.2800 | 0.3100 | 17.500 |
| PLRTE | red | 0.5800 | 0.3500 | 12.600 |
| APLRT | orange | 0.5200 | 0.3900 | 19.600 |
| UINFD | black | 0.2800 | 0.3100 | 0.000 |
| UINFF | grey | 0.2800 | 0.3100 | 17.500 |
| UIBCK | white | 0.2800 | 0.3100 | 56.000 |
| UIAFD | medium_blue | 0.2200 | 0.2400 | 31.500 |
| UINFR | red | 0.4800 | 0.3000 | 17.500 |
| UINFG | green | 0.3000 | 0.5200 | 42.000 |
| UINFO | orange | 0.5200 | 0.3900 | 19.600 |
| UINFB | blue | 0.1800 | 0.1500 | 15.400 |
| UINFM | magenta | 0.3000 | 0.1700 | 14.000 |
| UIBDR | grey | 0.2800 | 0.3100 | 17.500 |
| UIAFF | brown | 0.3600 | 0.4000 | 34.300 |
| OUTLW | black | 0.2800 | 0.3100 | 0.000 |
| OUTLL | brown | 0.3600 | 0.4000 | 34.300 |
| RES01 | grey | 0.2800 | 0.3100 | 31.500 |
| RES02 | grey | 0.2800 | 0.3100 | 31.500 |
| RES03 | grey | 0.2800 | 0.3100 | 31.500 |
| RES04 | grey | 0.2800 | 0.3100 | 31.500 |
| RES05 | grey | 0.2800 | 0.3100 | 31.500 |

Colour Table: **DAY_BLACKBACK**

| Token | Colour | X | Y | LUMINANCE |
|---|---|---|---|---|
| NODTA | grey | 0.2800 | 0.3100 | 25.000 |
| CURSR | orange | 0.5200 | 0.3900 | 28.000 |
| CHBLK | grey | 0.2800 | 0.3100 | 45.000 |
| CHGRD | grey | 0.2800 | 0.3100 | 45.000 |
| CHGRF | grey | 0.2800 | 0.3100 | 25.000 |
| CHRED | red | 0.4800 | 0.3000 | 25.000 |
| CHGRN | green | 0.3000 | 0.5200 | 60.000 |
| CHYLW | yellow | 0.4100 | 0.4700 | 70.000 |
| CHMGD | magenta | 0.2800 | 0.2400 | 53.000 |
| CHMGF | magenta | 0.3000 | 0.1700 | 20.000 |
| CHBRN | brown | 0.4200 | 0.4500 | 25.000 |
| CHWHT | white | 0.2800 | 0.3100 | 80.000 |
| SCLBR | orange | 0.5200 | 0.3900 | 28.000 |
| CHCOR | orange | 0.5200 | 0.3900 | 28.000 |
| LITRD | red | 0.4800 | 0.3000 | 25.000 |
| LITGN | green | 0.3000 | 0.5200 | 60.000 |
| LITYW | yellow | 0.4100 | 0.4700 | 70.000 |
| ISDNG | magenta | 0.2800 | 0.2400 | 53.000 |
| DNGHL | red | 0.4800 | 0.3000 | 25.000 |
| TRFCD | magenta | 0.2800 | 0.2400 | 53.000 |
| TRFCF | magenta | 0.3000 | 0.1700 | 20.000 |
| LANDA | brown | 0.3600 | 0.4000 | 20.000 |
| LANDF | brown | 0.4500 | 0.4500 | 45.000 |
| CSTLN | grey | 0.2800 | 0.3100 | 45.000 |
| SNDG1 | grey | 0.2800 | 0.3100 | 30.000 |
| SNDG2 | white | 0.2800 | 0.3100 | 80.000 |
| DEPSC | grey | 0.2800 | 0.3100 | 45.000 |
| DEPCN | grey | 0.2800 | 0.3100 | 25.000 |
| DEPDW | black | 0.2800 | 0.3100 | 0.000 |
| DEPMD | dark_blue | 0.2700 | 0.3000 | 2.000 |
| DEPMS | medium_blue | 0.2400 | 0.2600 | 8.000 |
| DEPVS | light_blue | 0.2200 | 0.2400 | 14.000 |
| DEPIT | yellow-green | 0.2600 | 0.3600 | 14.000 |
| RADHI | green | 0.3000 | 0.5200 | 60.000 |
| RADLO | green | 0.3000 | 0.5200 | 20.000 |
| ARPAT | blue-green | 0.2600 | 0.4200 | 50.000 |
| NINFO | orange | 0.5200 | 0.3900 | 28.000 |
| RESBL | blue | 0.1800 | 0.1500 | 22.000 |
| ADINF | yellow | 0.4100 | 0.4700 | 35.000 |
| RESGR | grey | 0.2800 | 0.3100 | 25.000 |
| SHIPS | white | 0.2800 | 0.3100 | 80.000 |
| PSTRK | white | 0.2800 | 0.3100 | 80.000 |
| SYTRK | grey | 0.2800 | 0.3100 | 30.000 |
| PLRTE | red | 0.5800 | 0.3500 | 18.000 |
| APLRT | orange | 0.5200 | 0.3900 | 28.000 |
| UINFD | white | 0.2800 | 0.3100 | 80.000 |
| UINFF | grey | 0.2800 | 0.3100 | 30.000 |
| UIBCK | black | 0.2800 | 0.3100 | 0.000 |
| UIAFD | light_blue | 0.2200 | 0.2400 | 14.000 |
| UINFR | red | 0.4800 | 0.3000 | 25.000 |
| UINFG | green | 0.3000 | 0.5200 | 60.000 |
| UINFO | orange | 0.5200 | 0.3900 | 28.000 |
| UINFB | blue | 0.1800 | 0.1500 | 22.000 |
| UINFM | magenta | 0.3000 | 0.1700 | 20.000 |
| UIBDR | grey | 0.2800 | 0.3100 | 45.000 |
| UIAFF | brown | 0.3600 | 0.4000 | 20.000 |
| OUTLW | black | 0.2800 | 0.3100 | 0.000 |
| OUTLL | brown | 0.3600 | 0.4000 | 20.000 |
| RES01 | grey | 0.2800 | 0.3100 | 25.000 |
| RES02 | grey | 0.2800 | 0.3100 | 25.000 |
| RES03 | grey | 0.2800 | 0.3100 | 25.000 |
| RES04 | grey | 0.2800 | 0.3100 | 25.000 |
| RES05 | grey | 0.2800 | 0.3100 | 25.000 |

Colour Table: **DUSK**

| Token | Colour | X | Y | LUMINANCE |
|---|---|---|---|---|
| NODTA | grey | 0.2800 | 0.3100 | 2.250 |
| CURSR | orange | 0.5200 | 0.3900 | 2.520 |
| CHBLK | grey | 0.2800 | 0.3100 | 4.050 |
| CHGRD | grey | 0.2800 | 0.3100 | 4.050 |
| CHGRF | grey | 0.2800 | 0.3100 | 2.250 |
| CHRED | red | 0.4800 | 0.3000 | 2.250 |
| CHGRN | green | 0.3000 | 0.5200 | 5.400 |
| CHYLW | yellow | 0.4100 | 0.4700 | 6.300 |
| CHMGD | magenta | 0.2800 | 0.2400 | 4.770 |
| CHMGF | magenta | 0.3000 | 0.1700 | 1.800 |
| CHBRN | brown | 0.4200 | 0.4500 | 2.250 |
| CHWHT | white | 0.2800 | 0.3100 | 7.200 |
| SCLBR | orange | 0.5200 | 0.3900 | 2.520 |
| CHCOR | orange | 0.5200 | 0.3900 | 2.520 |
| LITRD | red | 0.4800 | 0.3000 | 2.250 |
| LITGN | green | 0.3000 | 0.5200 | 5.400 |
| LITYW | yellow | 0.4100 | 0.4700 | 6.300 |
| ISDNG | magenta | 0.2800 | 0.2400 | 4.770 |
| DNGHL | red | 0.4800 | 0.3000 | 2.250 |
| TRFCD | magenta | 0.2800 | 0.2400 | 4.770 |
| TRFCF | magenta | 0.3000 | 0.1700 | 1.800 |
| LANDA | brown | 0.3600 | 0.4000 | 1.800 |
| LANDF | brown | 0.4500 | 0.4500 | 4.050 |
| CSTLN | grey | 0.2800 | 0.3100 | 4.050 |
| SNDG1 | grey | 0.2800 | 0.3100 | 2.700 |
| SNDG2 | white | 0.2800 | 0.3100 | 7.200 |
| DEPSC | grey | 0.2800 | 0.3100 | 4.050 |
| DEPCN | grey | 0.2800 | 0.3100 | 2.250 |
| DEPDW | black | 0.2800 | 0.3100 | 0.000 |
| DEPMD | dark_blue | 0.2700 | 0.3000 | 0.180 |
| DEPMS | medium_blue | 0.2400 | 0.2600 | 0.720 |
| DEPVS | light_blue | 0.2200 | 0.2400 | 1.260 |
| DEPIT | yellow-green | 0.2600 | 0.3600 | 1.260 |
| RADHI | green | 0.3000 | 0.5200 | 5.400 |
| RADLO | green | 0.3000 | 0.5200 | 1.800 |
| ARPAT | blue-green | 0.2600 | 0.4200 | 4.500 |
| NINFO | orange | 0.5200 | 0.3900 | 2.520 |
| RESBL | blue | 0.1800 | 0.1500 | 1.980 |
| ADINF | yellow | 0.4100 | 0.4700 | 3.150 |
| RESGR | grey | 0.2800 | 0.3100 | 2.250 |
| SHIPS | white | 0.2800 | 0.3100 | 7.200 |
| PSTRK | white | 0.2800 | 0.3100 | 7.200 |
| SYTRK | grey | 0.2800 | 0.3100 | 2.700 |
| PLRTE | red | 0.5800 | 0.3500 | 1.620 |
| APLRT | orange | 0.5200 | 0.3900 | 2.520 |
| UINFD | white | 0.2800 | 0.3100 | 7.200 |
| UINFF | grey | 0.2800 | 0.3100 | 2.700 |
| UIBCK | black | 0.2800 | 0.3100 | 0.000 |
| UIAFD | light_blue | 0.2200 | 0.2400 | 1.260 |
| UINFR | red | 0.4800 | 0.3000 | 2.250 |
| UINFG | green | 0.3000 | 0.5200 | 5.400 |
| UINFO | orange | 0.5200 | 0.3900 | 2.520 |
| UINFB | blue | 0.1800 | 0.1500 | 1.980 |
| UINFM | magenta | 0.3000 | 0.1700 | 1.800 |
| UIBDR | grey | 0.2800 | 0.3100 | 4.050 |
| UIAFF | brown | 0.3600 | 0.4000 | 1.800 |
| OUTLW | black | 0.2800 | 0.3100 | 0.000 |
| OUTLL | brown | 0.3600 | 0.4000 | 1.800 |
| RES01 | grey | 0.2800 | 0.3100 | 2.250 |
| RES02 | grey | 0.2800 | 0.3100 | 2.250 |
| RES03 | grey | 0.2800 | 0.3100 | 2.250 |
| RES04 | grey | 0.2800 | 0.3100 | 2.250 |
| RES05 | grey | 0.2800 | 0.3100 | 2.250 |

Colour Table: **NIGHT**

| Token | Colour | X | Y | LUMINANCE |
|---|---|---|---|---|
| NODTA | black | 0.2800 | 0.3100 | 0.000 |
| CURSR | orange | 0.5200 | 0.3900 | 1.200 |
| CHBLK | grey | 0.2800 | 0.3100 | 1.200 |
| CHGRD | grey | 0.2800 | 0.3100 | 1.200 |
| CHGRF | grey | 0.2800 | 0.3100 | 0.300 |
| CHRED | red | 0.5800 | 0.3500 | 1.000 |
| CHGRN | green | 0.3400 | 0.5400 | 1.000 |
| CHYLW | yellow | 0.4300 | 0.4600 | 1.200 |
| CHMGD | magenta | 0.3000 | 0.1700 | 1.100 |
| CHMGF | magenta | 0.3000 | 0.1700 | 1.100 |
| CHBRN | brown | 0.4200 | 0.4500 | 0.150 |
| CHWHT | white | 0.2800 | 0.3100 | 1.740 |
| SCLBR | orange | 0.5200 | 0.3900 | 1.200 |
| CHCOR | orange | 0.5200 | 0.3900 | 1.200 |
| LITRD | red | 0.5800 | 0.3500 | 1.000 |
| LITGN | green | 0.3400 | 0.5400 | 1.000 |
| LITYW | yellow | 0.4300 | 0.4600 | 1.200 |
| ISDNG | magenta | 0.3000 | 0.1700 | 1.100 |
| DNGHL | red | 0.5800 | 0.3500 | 1.000 |
| TRFCD | magenta | 0.3000 | 0.1700 | 1.400 |
| TRFCF | magenta | 0.3000 | 0.1700 | 1.100 |
| LANDA | brown | 0.3600 | 0.3600 | 0.100 |
| LANDF | brown | 0.4500 | 0.4500 | 0.300 |
| CSTLN | white | 0.2800 | 0.3100 | 1.740 |
| SNDG1 | grey | 0.2800 | 0.3100 | 1.200 |
| SNDG2 | white | 0.2800 | 0.3100 | 2.460 |
| DEPSC | white | 0.2800 | 0.3100 | 1.740 |
| DEPCN | grey | 0.2800 | 0.3100 | 1.200 |
| DEPDW | black | 0.2800 | 0.3100 | 0.000 |
| DEPMD | black | 0.2800 | 0.3100 | 0.000 |
| DEPMS | dark-blue | 0.1600 | 0.0800 | 0.040 |
| DEPVS | dark-blue | 0.1600 | 0.0800 | 0.040 |
| DEPIT | yellow-green | 0.2800 | 0.3600 | 0.010 |
| RADHI | green | 0.3400 | 0.5400 | 1.000 |
| RADLO | green | 0.3400 | 0.5400 | 0.200 |
| ARPAT | blue-green | 0.2600 | 0.4200 | 0.800 |
| NINFO | orange | 0.5200 | 0.3900 | 1.200 |
| RESBL | blue | 0.1800 | 0.1300 | 1.200 |
| ADINF | yellow | 0.4300 | 0.4600 | 1.200 |
| RESGR | grey | 0.2800 | 0.3100 | 0.300 |
| SHIPS | white | 0.2800 | 0.3100 | 1.740 |
| PSTRK | white | 0.2800 | 0.3100 | 1.740 |
| SYTRK | grey | 0.2800 | 0.3100 | 1.200 |
| PLRTE | red | 0.5800 | 0.3500 | 1.300 |
| APLRT | orange | 0.5200 | 0.3900 | 1.200 |
| UINFD | grey | 0.2800 | 0.3100 | 2.460 |
| UINFF | white | 0.2800 | 0.3100 | 1.200 |
| UIBCK | black | 0.2800 | 0.3100 | 0.000 |
| UIAFD | dark-blue | 0.1600 | 0.0800 | 0.040 |
| UINFR | red | 0.5800 | 0.3500 | 1.000 |
| UINFG | green | 0.3400 | 0.5400 | 1.000 |
| UINFO | orange | 0.5200 | 0.3900 | 1.200 |
| UINFB | blue | 0.1800 | 0.1300 | 1.200 |
| UINFM | magenta | 0.3000 | 0.1700 | 1.100 |
| UIBDR | grey | 0.2800 | 0.3100 | 1.200 |
| UIAFF | brown | 0.3600 | 0.3600 | 0.100 |
| OUTLW | black | 0.2800 | 0.3100 | 0.000 |
| OUTLL | brown | 0.3600 | 0.3600 | 0.100 |
| RES01 | black | 0.2800 | 0.3100 | 0.000 |
| RES02 | black | 0.2800 | 0.3100 | 0.000 |
| RES03 | black | 0.2800 | 0.3100 | 0.000 |
| RES04 | black | 0.2800 | 0.3100 | 0.000 |
| RES05 | black | 0.2800 | 0.3100 | 0.000 |

## 13.2 Viewing Groups

The use of viewing groups is explained in 8.3.4.4.

**NUMBERING SCHEME FOR VIEWING GROUPS *(Mariners' information in italics)***

00000-09999 reserved for administrative purposes

| **DISPLAY BASE** | **STANDARD DISPLAY** | **OTHER INFORMATION** |
|---|---|---|
| 10000 reserved<br>*40000 reserved* | 20000 reserved<br>*50000 reserved* | 30000 reserved<br>*60000 reserved* |
| 11000 A,B information about the chart display<br>*41000 tools* | | |
| | 21000 A,B<br>51000 tool | |
| | | 31000 A,B<br>*61000 tools* |
| 12000 C, D, E, F land features<br>*42000 own ship, planned route* | | |
| | 22000 C, D, E, F<br>*52000 own ship etc* | |
| | | 32000 C, D, E, F<br>*62000 own ship etc* |
| 13000 H, I depths & currents<br>*43000 mariners' features* | | |
| | 23000 H,I<br>*53000 mariners' features* | |
| | | 33000 H,I<br>*63000 mariners' features* |
| 14000 J,K,L obstructions, pipelines<br>*44000 other vessels* | | |
| | 24000 J,K,L<br>*54000 other vessels* | |
| | | 34000 J,K,L<br>*64000 other vessels* |
| 15000 M traffic,routes<br>*45000 manufacturers' features* | | |
| | 25000 M<br>*55000 manufacturers' features* | |
| | | 35000 M<br>*65000 mfrs' features* |
| 16000 N special areas<br>*46000 mariners' assignments* | | |
| | 26000 N<br>*56000 mariners' assignments* | |
| | | 36000 N<br>*66000 mariners' assgnts* |

| DISPLAY BASE | STANDARD DISPLAY | OTHER INFORMATION |
|---|---|---|
| 17000 P,Q,R,S buoys, beacons, lights, radar<br>*47000 reserved for mariners' information* | | |
| | 27000 P,Q,R,S<br>*57000 reserved* | |
| | | 37000 P,Q,R,S<br>*67000 reserved* |
| 18000 T,U services & small craft facilities<br>*48000 reserved for mariners' information* | | |
| | 28000 T,U<br>*58000 reserved* | |
| | | 38000 T,U<br>*68000 reserved* |
| 19000-19999 reserved<br>*49000-49999 reserved* | 29000-29999 reserved<br>*59000-59999 reserved* | 39000-39999 reserved<br>*69000-69999 reserved* |

70000-99999 reserved for future use.

Notes:

1. These viewing groups reflect the display category, but they do not set it. Display Category is set by field 6 of the look-up table.

2. Gaps between sets and groups are left deliberately to allow for future expansion. "na" means that a particular set or group is not yet assigned (not "populated").

**CHART INFORMATION - DISPLAY BASE**

(Note: The groupings below are given solely to illustrate the contents of the Display Base. All objects of this category should be permanently retained on the ECDIS display.)

RESERVED

10000-10999 reserved for chart information.

A, B INFORMATION ABOUT IHE CHART DISPLAY

11000 Information about the Chart Display
11010 cursor [symbol SY(CURSRA01)]11020 na (not assigned)
11030 Scalebar, latitude scale [SY(SCALEB10),SY( SCALEB11)]
11040 north arrow [SY(NORTHAR1)]
11050 no data [colour NODTA, AP(NODATA03)], unsurveyed (UNSARE), incompletely surveyed area
11060 HO data limit LC(HODATA01) (M_COVR)

C, D, E, F NATURAL & MAN-MADE FEATURES, PORT FEATURES

12000 Land area
12010 land area (LANDARE)

12200 Dangers above water
12210 bridge (BRIDGE), pylon (PYLONS), overhead cable (CBLOHD), conveyor (CONVYR), overhead pipeline (PIPOHD), offshore platform (OFSPLF)

12400 Shoreline
12410 Coastline (COALNE), ice shelf, glacier (ICEARE), shoreline construction (SLCONS), tie-up wall, dolphin (MORFAC), gate (GATCON, pile (PILPNT) crib, wellhead, ice boom (OBSTRN),, floating dock (FLODOC), hulk (HULKES), pontoon (PONTON), oilboom (OILBAR), log boom (LOGPON), flood barrage (DAMCON, CATDAM3)

12420 dock (DOCARE), lock (LOKBSN), canal (CANALS)

H, I DEPTHS, CURRENTS ETC

13000 Safety Contour
13010 Safety contour (from conditional symbology procedure DEPCNT02)
13020 na
13030 depth area (DEPARE), dredged area (DRGARE),

J, K, L SEABED, OBSTRUCTIONS, PIPELINES

14000 Dangers under water
14010 isolated underwater dangers in own-ship safe water (rocks, wrecks, obstructions, mooring cables from conditional symbology procedure)

| | |
|---|---|
| M | TRAFFIC ROUTES |
| 15000 | Traffic Routeing |
| 15010 | traffic lane (TSSLPT), deep water route (DWRTPT), traffic separation area (TSEZNE), traffic separation line (TSELNE), traffic roundabout (TSSRON), traffic crossing (TSSCRS), precautionary area (PRCARE), traffic separation scheme boundary (TSSBND), deep water route centre line (DWRTCL), two way route part (TWRTPT), inshore traffic zone (ISTZNE) |
| 15020 | recommended traffic lane (RCTLPT), recommended route centreline (RCRTCL) |
| 15030 | na |
| 15040 | na |
| 15050 | na |
| 15060 | radio calling in point (RDOCAL) |
| N | SPECIAL AREAS |
| 16000-16999 | na |
| P, Q, R, S | BUOYS & BEACONS, LIGHTS, FOG SIGNALS, RADAR |
| 17000 | Buoys and beacons, |
| 17010 | buoy (BOYxxx), light float (LITFLT), mooring buoy (MORFAC, CATMOR7) |
| 17011 | Light vessel (LITVES) |
| 17020 | beacon (BCNxxx), |
| T, U | SERVICES & SMALL CRAFT FACILITIES |
| 18000-18999 | na |
| RESERVED | |
| 19000-19999 | reserved for chart information |

**CHART INFORMATION - STANDARD DISPLAY**

| | |
|---|---|
| RESERVED | |
| 20000 | reserved for chart information |
| A, B | INFORMATION ABOUT THE CHART DISPLAY |
| 21000 | Information about the Chart Display |
| 21010 | unknown object (magenta question mark) |
| 21020 | na |
| 21030 | chart scale boundary, overscale data [AP(OVERSCO1)] |
| 21040 | na |
| 21050 | na |
| 21060 | place-holder for geographic names (LNDRGN, SEAARE) |

C, D, E, F NATURAL & MAN-MADE FEATURES, PORT FEATURES

22000 Major Coastal Features
22010 river (RIVERS), riverbank (RIVBNK), lake (LAKARE), lakeshore (LAKSHR), sloping ground (SLOGRD), slope top (SLOTOP), dyke (DYKCON), causeway (CAUSWY), dam (DAMCON),

22200 Conspicuous landmarks:
22210 radar conspicuous object - (any object with attribute CONRAD 1)
22220 visually conspicuous object (any object with attribute CONVIS 1)
22230 na
22240 built up area (BUAARE),

H, I DEPTHS, CURRENTS ETC

23000 Depths
23010 area of depth less than the safety contour (DIAMON01 pattern)
23020 na
23030 swept area (SWPARE)

J, K, L SEABED, OBSTRUCTIONS, PIPELINES

24000 Seabed dangers
24010 mooring cables (MORFAC, CATMOR6), (CBLSUB, CATCBL6), tunnel on seabed (TUNNEL, BURDEP=0), sandwaves (SNDWAV)

M TRAFFIC ROUTES

25000 Routes
25010 leading line, clearing line (NAVLINE)
25020 recommended track (RECTRC)
25030 ferry route (FERYRT)
25040 radar line (RADLNE), limit of shore radar (RADRNG)

N SPECIAL AREAS

26000 Restricted and Cautionary Areas
26010 restricted area (RESARE)
26020 na
26030 na
26040 ferry route area (FERYRT), submarine transit lane (SUBTLN), military practice area (MIPARE), sea plane landing area (SPLARE), offshore production area (OSPARE)
26050 caution area (CTNARE), fairway (FAIRWY)

| | |
|---|---|
| 26200 | Information Areas. Protected Areas |
| 26210 | fishing ground (FSHGRD), marine farm (MARCUL) |
| 26220 | anchorage area (ACHARE), anchor berth (ACHBRT), |
| 26230 | pipeline area (PIPARE), cable area (CBLARE) |
| 26240 | dumping ground (DMPGRD), |
| 26250 | cargo transhipment (CTSARE), incineration (ICNARE) |

P, Q, R, S BUOYS & BEACONS, LIGHTS, FOG SIGNALS, RADAR

| | |
|---|---|
| 27000 | Buoys, Beacons, Topmarks, Lights, Fog Signals |
| 27010 | na |
| 27020 | na |
| 27025 | daymark (DAYMAR) |
| 27030 | na |
| 27040 | direction of buoyage IALA buoyage regions (M_NSYS) |
| 27050 | topmarks (TOPMAR) - for paper chart symbols |
| 27060 | na |
| 27070 | light (LIGHTS), |
| 27080 | fog signal (FOGSIG), retro-reflector (RETRFL) |
| 27200 | Radar |
| 27210 | racon (RTPBCN) |
| 27220 | na |
| 27230 | radar reflector (RADRFL) |

T, U SERVICES & SMALL CRAFT FACILITIES

| | |
|---|---|
| 28000 | Services |
| 28010 | pilot boarding point (PILBOP) |
| 28020 | signal station, traffic (SISTAT), sig. stn. warning (SISTAW) |

RESERVED

| | |
|---|---|
| 29000 | reserved for chart information |

**OTHER CHART INFORMATION**

RESERVED

| | |
|---|---|
| 30000 | reserved for chart information |
| | |
| A, B | INFORMATION ABOUT THE CHART DISPLAY |
| | |
| 31000 | Information about the Chart Display |
| 31010 | accuracy of data (MPCCY), survey reliability (M_SREL), survey source (M_SSOR) quality of data (M_QUAL) |
| 31020 | nautical publication (M_NPUB) |
| 31030 | information from attributes INFORM, TXTDSC, PICREP |
| 31040 | data scale and coverage (M_CSCL, M_COVR) |
| 31050 | na |
| 31060 | na |
| 31070 | na |
| 31080 | magnetic variation (MAGVAR), local magnetic anomaly (LOCMAG) |
| | |
| C, D, E, F | NATURAL & MAN-MADE FEATURES, PORT FEATURES |
| | |
| 32000 | Natural Features |
| 32010 | dunes , hills (SLOGRD), ridge, clifftop (SLOTOP), contours and elevation (LNDELV) |
| 32020 | na |
| 32030 | trees , vegetation, mangrove (VEGATN), marsh (LNDRGN) |
| 32040 | |
| 32050 | river (RIVERS) or lake (LAKARE); also rapids (RAPIDS), waterfall (WATFAL) |
| 32060 | na |
| 32070 | tideway (TIDWAY), saltpan (SLTPAN) |
| 32080 | na |
| | |
| 32200 | Shore Structures |
| 32210 | na |
| 32220 | any of the following not classified as CONVIS1 (conspicuous): landmark (LNDMRK), building (BUISGL), tank, silo, water tower (SILTNK)cairn (CAIRNS), wall (FNCLNE), fort (FORSTC) |
| 32230 | na |
| 32240 | airport (AIRARE), runway (RUNWAY) |
| 32250 | railway (RAILWY), road (ROADWY), tunnel (TUNNEL), control point (CTRPNT) |
| 32260 | na |
| 32270 | quarry, refinery, power station, tank farm, wind farm, factory, timber yard (PRDARE) |
| 32280 | na |
| 32400 | Port Features |
| 32410 | harbour type (HRBFAC), customs check point (CHKPNT) [note: "small craft facilities" (SMCFAC) is in group 38210] |
| 32420 | na |
| 32430 | distance mark (DISMAR) |
| 32440 | berthing facility (such as wharf) (BRTFAC), berth number (BERTHS), mooring facility (such as bollard) (MORFAC), , gate (such as lock gate) (GATCON) , dry dock (DRYDOC), crane (CRANES) |
| 32450 | |
| 32460 | gridiron (GRIDRN), |

| | |
|---|---|
| H, I | DEPTHS, CURRENTS ETC |
| 33000 | Depths, Currents, Tide rips, etc |
| 33010 | Soundings (SOUNDG) |
| 33020 | depth contours (DEPCNT) other than the safety contour, line depth area (DEPARE) |
| 33030 | na |
| 33040 | water turbulence (WATTUR) |
| 33050 | tidal information (T_HMON, T_NHM, T_TIMS) |
| 33060 | current and tidal stream information (CURENT, TS_FEB, TS_PAD, TS_PNH, TS_PRH, TS_TIS) |
| J, K, L | SEABED, OBSTRUCTIONS, PIPELINES |
| 34000 | Seabed Information: rocks, wrecks & obstns, pipes & cables |
| 34010 | nature of seabed (SBDARE), |
| 34020 | spring (SPRING), sea weed (WEDKLP) |
| 34030 | na |
| 34040 | fish haven (FSHHAV), fishing stakes, etc. (FSHFAC), |
| 34050 | rocks (UWTROC), wrecks (WRECKS), obstructions (OBSTNS), which are not a danger to own-ship's navigation (these are all Display Base if a danger to own-ship) |
| 34060 | na |
| 34070 | submarine cable (CBLSUB), submarine pipeline (PIPSOL) |
| M | TRAFFIC ROUTES |
| 35000 | Routes |
| 35010 | na |
| N | SPECIAL AREAS |
| 36000 | Administrative Areas, (by cursor enquiry) |
| 36010 | continental shelf (COSARE), |
| 36020 | harbour area (HRBARE) free port area (FRPARE), customs zone (CUSZNE) |
| 36030 | na |
| 36040 | fishery zone (FSHZNE) |
| 36050 | contiguous zone (CONZNE), exclusive economic zone (EXEZNE), national territorial area (NATARE), territorial sea (TESARE), territorial sea baseline (STSLNE), administration area (ADMARE) |
| P, Q, R, S | BUOYS & BEACONS, LIGHTS, FOG SIGNALS, RADAR |
| 37000-37999 | na |

T, U SERVICES & SMALL CRAFT FACILITIES

38000 Services
38010 radar station (RADSTA), radio station (RDOSTA)
38020 na
38030 coastguard station (CGUSTA), rescue station (RSCSTA)

38200 Small craft facilities
38210 small craft facilities (SMCFAC)

RESERVED

39000 reserved for chart information

**MARINERS' INFORMATION - DISPLAY BASE**

RESERVED

40000 reserved for mariners' information

TOOLS

41000-41999 na

OWN-SHIP, PLANNED ROUTES, PAST TRACKS

42000 Own ship
42010 Own ship (ownship), symbol or scaled version, together with heading line, beam bearing line and course and speed vector

42200 Selected Planned Route
42210 legline (leglin, select 1), way points (waypnt, select 1)
42020 Course to make good for selected leglines

MARINERS' FEATURES

43000

OTHER VESSELS

44000

MANUFACTURERS' FEATURES

45000-45999 Manufacturers' Features

MARINERS' ASSIGNMENTS TO DISPLAY BASE

46000-46999 Mariners' and manufacturers' objects assigned to Display Base by the mariner

RESERVED

47000-49999 reserved for mariners' information

**MARINERS' INFORMATION - STANDARD DISPLAY**

RESERVED

50000 reserved for mariners' information

TOOLS

51000-51999 na

OWN-SHIP, PLANNED ROUTES, PAST TRACKS

52000 Notations on Selected Planned Route
52010 wheel-over line (wholin), selected route
52020 course to make good on leglines (leglin, select 1) of selected route
52030 planned position (pinpos), distance to go, and other notations on selected planned route

52200 Alternate Planned Route
52210 leglin (leglin, select 2), waypoint (waypnt, select 2) of alternate planned route
52220 na
52230 wheel-over line (wholin), alternate route
52240 other notations, alternate route

52400 Past Track
52410 event (events)
52420 na
52430 primary past track (pastrk, catpst 1)
52440 notations on primary past track
52450 na
52460 secondary past track (pastrk catpst 2)

MARINERS' FEATURES

| | |
|---|---|
| 53000 | Mariners' features |
| 53010 | danger highlight (dnghlt) |
| 53020 | clearing line (clrlin) |
| 53030 | mariners' information note (marnot catnot 1) |
| 53040 | mariners' cautionary note (marnot catnot 2) |
| 53050 | mariners' feature (marfea) |
| 53060 | na |
| 53070 | na |
| 53080 | tidal current observed (tidcur, catcur 2), tidal current predicted (tidcur, catcur 1) |

OTHER VESSELS

| | |
|---|---|
| 54000 | Other Ships |
| 54010 | other ships (vessels) from radar |
| 54020 | notations on other ships (acqsta) |
| 54030 | other ships from other sources or undefined sources |

MANUFACTURERS' FEATURES

| | |
|---|---|
| 55000 | Manufacturers' Features |
| 55010 | manufacturers' feature (mnufea, catnot 1) |
| 55020 | manufacturers' feature (mnufea, catnot 2) |

MARINERS' ASSIGNMENTS TO STANDARD DISPLAY

| | |
|---|---|
| 56000-56999 | Mariners' and manufacturers' Objects Assigned to Standard Display by the Mariner |

RESERVED

| | |
|---|---|
| 57000-59999 | reserved for mariners' information |

**OTHER MARINERS' INFORMATION**

RESERVED

| | |
|---|---|
| 60000 | reserved for mariners' information |

TOOLS

| | |
|---|---|
| 61000 | Tools |
| 61010 | electronic bearing line (ebline), variable range marker (vrmark) |
| 61020 | na |
| 61030 | range rings (rngrng) |
| 61040 | cursor, style B (cursor, cursty2) |
| 61050 | cursor reference point (refpnt) |

OWN-SHIP, PLANNED ROUTES, PAST TRACKS

| | |
|---|---|
| 62000 | Position fixes |
| 62010 | position fix (positn) |
| 62020 | position line (poslin) |

MARINERS' FEATURES

| | |
|---|---|
| 63000-63999 | na |

OTHER VESSELS

| | |
|---|---|
| 64000-64999 | na |

MANUFACTURERS' FEATURES

| | |
|---|---|
| 65000-65999 | Manufacturers' Features |

MARINERS' ASSIGNMENTS TO OTHER INFORMATION

| | |
|---|---|
| 66000-66999 | Mariners' and manufacturers' objects assigned to other information by the mariner |

RESERVED

| | |
|---|---|
| 67000-69999 | reserved for mariners' information |

**EXAMPLE**

The following is an example of how the above viewing groups might be implemented in an ECDIS:

| Over-group | content | viewing groups included |
|---|---|---|
| 1 | Display Base | 10000 - 19999, 40000 - 49999 |
| Standard display - chart: | | |
| 2 | unknown object | 21010 |
| 3 | chart data coverage | 21020 - 21060 |
| 4 | land features | 22010 - 22260 |
| 5 | area of depth less than safety contour | 23010 |
| 6 | water and seabed features | 23020 - 24010 |
| 7 | traffic routes | 25010 - 25040 |
| 8 | cautionary areas | 26010 - 26050 |
| 9 | information areas | 26210 - 26270 |
| 10 | buoys & beacons | 27010 - 27050 |
| 11 | lights | 27070 |

| | | |
|---|---|---|
| 12 | fog signals | 27080 |
| 13 | radar | 27210 - 27230 |
| 14 | services (pilot, signal stns) | 28010 - 28020 |

Standard display - mariners' features:

| | | |
|---|---|---|
| 15 | notations on planned route | 52010 - 52030 |
| 16 | alternate planned route | 52210 - 52240 |
| 17 | past track | 52410 - 52440 |
| 18 | secondary past track | 52460 |
| 19 | mariners' features | 53010 - 53080 |
| 20 | other vessels | 54010 - 54030 |
| 21 | manufacturers' features | 55010 - 55020 |
| 22 | mariners' assignments to std. display | 56000 - 56999 |

Other chart information:

| | | |
|---|---|---|
| 23 | information about chart data | 31010 - 31070 |
| 24 | land features | 32010 - 32460 |
| 25 | soundings | 33010 |
| 26 | depth contours, currents, magnetics | 33020 - 33060 & 31080 |
| 27 | seabed and obstructions | 34010 - 34070 |
| 28 | services and small craft facilities | 38010 - 38210 |

Other mariners' information:

| | | |
|---|---|---|
| 29 | tools for chartwork | 61010 - 61050 |
| 30 | position fixes | 62010 - 62020 |
| 31 | other vessels, mariners' & mfrs' features (not assigned at present). | |

### 13.3 Text Groupings

The text groupings are:

00-10 reserved for future assignment by IHO .

10 Important Text

11 vertical clearance of bridges, overhead cable, pipe or conveyor (BRIDGE, CBLOHD, PIPOHD, CONVYR, VERCLR, VERCCL, VERCOP), bearing of navline, recommended route, deep water route centreline line (NAVLNE, RCRTCL, DWRTCL, ORIENT),

name and communications channel of radio calling-in point (RDOCAL, OBJNAM, COMCHA).

20 Other text

21 names for position reporting:

name or number (OBJNAM) of buoys (BOYxxx), beacons(BCNxxx), daymarks (DAYMAR), light vessel, light float (LITVES, LITFLT), offshore platform (OFSPLF) .

22 na (not allocated)

23 light description string

24 note on chart data (INFORM) or nautical publication (TXTDSC)

25 nature of seabed (NATSUR of SBDARE)

26 geographic names (OBJNAM of SEAARE, LNDRGN etc.)

27 value of: magnetic variation (VALMAG of MAGVAR); swept depth (DRVAL1 of SWPARE)

28 na

29 berth number (OBJNAM of BERTHS, ACHBRT)
30 na
*31 national language text (NOBJNM, NINFOM, NTXTDS)

32-49 reserved for IHO

50-69 mariners' text, including planned speed etc.

70-79 manufacturer's text

80-99 future requirements (AIS etc.)

* National text is a supplementary option for ECDIS. If used, the style should be similar to that of the Presentation Library.

## 13.4 Abbreviations

The following abbreviations are used on the ECDIS display:

### 13.4.1 'TE' text command abbreviations

The following abbreviations are used with the «TE» command word:

| Prefixes: | Suffixes |
|---|---|
| bn = beacon (INT1) kn = knots (INT1) | |
| by = buoy | deg = degrees |
| clr = overhead clearance | |
| clr cl = clearance closed | |
| clr op = clearance open | |
| sf clr = safe clearance | |
| No = number (INT1) | |
| Plt = pilot | |
| Prod = offshore production (INT1) | |
| LtV = light vessel (INT1) | |
| varn = magnetic variation | |
| ch = communication channel | |
| NMT = not more than «CLEARING BEARING» | |
| NLT = not less than «CLEARING BEARING» | |

### 13.4.2 Light description Abbreviations

| | |
|---|---|
| Dir | directional |
| Aero | aeronautical |
| | |
| F | fixed |
| Fl | flashing |
| LFl | long-flashing |
| Q | quick-flashing |
| VQ | very quick-flashing |
| UQ | ultra quick-flashing |
| Iso | isophased |
| Oc | occulting |
| IQ | interrupted quick-flashing |
| IVQ | interrupted very quick-flashing |
| IUQ | interrupted ultra quick-flashing |
| Mo | morse |
| FFl | fixed/flash |
| Fl+LFl | flash/long-flash |
| AlOc Fl | alternating occulting/flashing |
| FLFl | fixed/long-flash |
| AlOc | alternating occulting |
| AlLFl | alternating long-flash |
| AlFl | alternating flash |
| Al | group alternating |
| Q+LFl | quick-flash plus long-flash |
| VQ+LFl | very quick-flash plus long-flash |
| UQ+LFl | ultra quick-flash plus long-flash |
| Al | alternating |
| AlF Fl | alternating fixed and flashing |
| | |
| W | White |
| R | Red |
| G | Green |
| Y | Yellow |
| | |
| occas | occasional |
| temp | temporary |
| priv | private |
| exting | extinguished |
| | |
| m | metres |
| M | nautical miles |

### 13.4.3 Nature of seabed abbreviations ('TX')

The following abbreviations may be used for values of NATSUR - nature of seabed:

| | | | |
|---|---|---|---|
| NATSUR 1, mud | M | NATSUR 8, cobbles | Cb |
| NATSUR 2, clay | Cy | NATSUR 9, rock | R |
| NATSUR 3, silt | Si | NATSUR 11, lava | R |
| NATSUR 4, sand | S | NATSUR 14, coral | Co |
| NATSUR 5, stones | St | NATSUR 17, shells | Sh |
| NATSUR 6, gravel | G | NATSUR 18, boulder | R |
| NATSUR 7, pebbles | P | | |

## 14. IMPLEMENTATION OF THE PRESENTATION LIBRARY'S COLOUR MODEL ON AN 8 BITS GRAPHIC DEVICE

**This note is for discussion only. There is no requirement to follow the suggestions given.**

Nowadays a graphic system with a colour depth of 8 bits can be seen as the standard for low and medium priced computer graphic devices. Such a system is capable of displaying up to 256 different colours at a time. Most computer manufacturers offer their systems with graphic devices of this kind. Screen resolutions are independent on the number of colours and are available in a range from 640X480 to 2560X2048 pixel. A computer system supporting 256 different colours and a resolution of 1024X768 or 1280X1024 pixel is the most likely one to become the platform for an ECS or ECDIS system. The colour model of the presentation library for ECDIS was not designed to match the conditions of a certain hardware or computer model. Therefore it's up to the manufacturer of the ECDIS system to find a suitable way for a physical implementation on his graphic equipment.

Following a suggested way for the implementation of the presentation library's colour model on a standard graphic system supporting 256 colours is described.

The terminology is taken from the MIT's X Window System, which has become a widely accepted graphic software standard for modern computer systems. The biggest problem with low cost graphic systems is the presentation of moving objects like ship symbols, arpa targets etc. On more advanced devices the graphic display can be split into several separate planes, which means that one can draw into one plane without changing the contents of other planes. This plane splitting is done in the hardware of those devices. With low cost systems, this effect can be achieved by simulating the splitting within the display software.

A common technique to draw a moving symbol is to draw it in xor mode. The symbol will appear when it's first drawn and disappear when it's drawn a second time at the same position. The disadvantage of the xor drawing mode is that the colour presentation of the symbol changes depending on the background which the symbol is drawn on. This effect can be eliminated by ordering the colours used for drawing in a certain way. Assuming an 8 bits graphic display memory, a pixel can have any value between 0 and 255, referencing exactly one of 256 entries in the system's colour table. This colour table entry determines the appearance of the pixel on the screen by translating its related RGB values into hardware dependent CRT gun voltages. The 8 bits of the colour table index, i.e. the pixel's value, are now divided into logical sections, simulating the plane splitting. For drawing the chart contents, the user interface and several other mandatory objects, approximately 60 colours are needed according to the presentation library's colour scheme. With 6 bits, 64 colours can be displayed, so 6 of the 8 bits are already needed for this purpose. The remaining 2 bits can be used for the display of moving objects like cursor, ship symbol and arpa targets. When looking at this as a simulated 2 bits plane, the need for transparency is obvious. Therefore with the 4 different indices which can be expressed by 2 bits, 3 colours and transparency can be displayed. This splitting of the 8 bits in one logical plane using 6 bits and one using 2 bits leads to the following colour table, where the 6 bits plane is referred to as underlay plane, the 2 bits plane as overlay plane:

| bits set | colour table index | displayed colour = colour token |
|---|---|---|
| 00xxxxxx | 0..63 | underlay colours 0..63 (chart and user interface) |
| 01xxxxxx | 64..127 | overlay colour 1 = SHIPS (ship symbol) |
| 10xxxxxx | 128..191 | overlay colour 2 = ARPA1(arpa targets) |
| 11xxxxxx | 192..255 | overlay colour 3 = CURSR (cursor) |

If now something is drawn with one of the overlay colours using the xor mode, the correct colour will show up on the screen, because the lower 6 bits of the colour index are not longer affecting the appearance. This way the xor mode can be used to draw moving symbols without the disturbing colour effects.

The disadvantages of this solution are:

- the strange colour effect with drawing in xor mode still appears when symbols drawn with different overlay colours overlap each other.

- only 3 different colours are available for drawing into the overlay plane.

Some graphic libraries offer more advanced functions with which these features can be achieved more easily. The X Window System for example offers special features for manipulating separate planes. Most, but not all computer models are supported by the X Window System.

The described solution is of course not the only possible one, but it should be easy to implement it into a large variety of low cost computer systems, making them suitable for an ECDIS.

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(3) International Maritime Organization: Performance Standard for Electronic Chart Display and Information Systems; (Current Edition).

(4) International Hydrographic Organization, Committee on Hydrographic Requirements for Information Systems: Specifications for Chart Content and Display Aspects of ECDIS / International Hydrographic Bureau, Monaco. (Special Publication No.52, Current Edition)

(5) International Hydrographic Organization, Committee on Hydrographic Requirements for Information Systems: Colour & Symbol Specifications for ECDIS / International Hydrographic Bureau, Monaco. (Special Publication No.52. Appendix 2, Current Edition).

(6) International Hydrographic Organization, Committee on Hydrographic Requirements for Information Systems: Glossary of ECDIS-related Terms / International Hydrographic Bureau, Monaco. (Special Publication No.52. Appendix 3, Current Edition)

(7) International Hydrographic Organization, Committee on Hydrographic Requirements for Information Systems : IHO Transfer Standard for Digital Hydrographic Data / International Hydrographic Bureau, Monaco. (Special Publication No.57, Current Edition)

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Peter Burger, Duncan Gillies, Addison-Wesley Publishing Company, ISBN 0-201-17439-1

Introduction to the X-Windows System

Oliver Jones, Prentice Hall, Englewood Cliffs, New Jersey 07632, ISBN 0-13-499997-5

## 17. GLOSSARY

This glossary explains some of the terms used with special meanings in the Presentation Library. For strict definitions of ECDIS terminology in general, see appendix 3 to IHO S-52.

| | |
|---|---|
| Colour Token: | A five letter, self-evident code describing the usage of a colour. The day and night colours which are identified by the token are given in the colour tables (in CIE coordinates). Note that several colour tokens may share the same colour. |
| Symbology Instruction: | A machine readable symbolization order used in look-up tables to link object-classes to symbols, in straight forward cases (e.g. pilot boarding place) |
| Conditional Symbology Procedure: | A decision-making procedure used to link an object-class to a symbol in cases where the symbol depends on circumstances (e.g. whether a wreck is symbolized as an "isolated danger" depends on its relationship to the safety contour chosen by the mariner) or where symbolization is complex (e.g. light sector). |
| Display Generator: | Software written by the ECDIS manufacturer to take an object from the SENC, assign a symbol and colour to it, and present it appropriately on the display, using the tables and procedures provided in the Presentation Library. |
| SCAMIN: | The smallest scale at which an object is shown ( e.g. a minor light, SCAMIN of 1:50,000, would not be shown at a scale of 1:75,000). |
| Display Priority: | Hierarchy to decide which line or point symbol is to be shown when two objects overlap. Priority 2 overwrites 1. |
| Radar priority: | IMO PS (3) require that radar can be switched off with a "single action control" in order to see SENC and mariners info clearly. However certain other info, such as planned route, safety contour, coastline should always be written over the radar. |
| Display Category: | IMO PS (3) establish three categories for SENC objects:<br>Display base: vital info, always on the display<br>Standard display: important objects, default display<br>Other: all other objects in the SENC |
| Pivot Point: | The pivot point is the point around which the symbol gets scaled and rotated. When the symbol is placed in the world space, the symbol's pivot point is positioned exactly on the object's position and all elements of the symbol are geometrically related to that position. |

| | |
|---|---|
| Opaque fill: | The background is completely filled with the colour fill. (e.g. depth area). The point and line SENC features may be overwritten. The raw RADAR image is a special case of opaque fill which overwrites all other features expect those with "priority over radar" (OVERRADAR). |
| Transparent fill: | A method of identifying areas by covering a given percentage of each 4 pixel square with the fill colour, leaving the remainder "transparent". Used to ensure the information underneath shows through. |
| Radar Transparency: | A method of varing the transparency of radar in a continuous progression from no radar to a totally opaque radar overlay, by merging the radar colour with the colour of the object it overlays at each pixel. |
| Pattern fill: | A method of identifying areas by large, faintly coloured symbols well spaced out across the area. A pattern spacing algorithm ensures that the pattern symbols are visible without being so dense as to cause clutter. Used to ensure pattern symbols are always visible at any display scale. |
| Text label: | Includes for example, , light descriptions, place names etc. |
| Transfer, Exchange: | These words are used as verbs or nouns to mean "provide" or "carry information". |
| Exchange Set: | Newly provided copy of all or part of the Presentation Library. |
| Geometric Primitive: | A plain point, a plain line, a plain area as defined in geometry (i.e. without any meaning attached). |
| Unknown Object: | If an object-class for an object is not listed in the look-up table the ECDIS cannot present it on the display. The ECDIS should notify the mariner that an unknown object exists in the display area, and on request symbolizes all such objects with '?' and list their Lat, Long. |
| "No symbol" Object: | In some cases, the database contains information that is not intended for display. (An example might be a general area such as 'Great Australian Bight' which would be available for an answer to cursor interrogation of the sea area.) |
| simple line styles: | Solid lines, dots and dashes |
| complex line styles: | Lines that are symbols as well, or that have symbols interlaced. Examples of a line as a symbol are a submerged pipeline, or the T T T lines indicating the inside of an area. A simple or complex line may have a symbol interlaced, such as an anchor for anchorage area. |

Raster format symbol: A symbol described in screen pixels. The size increases as the screen dimension increases without additional pixels. Raster symbols look sharper and are consistent, but they have to be re-defined in order to change size or orientation.

Vector format symbol: A symbol described in vector coordinates. The orientation of vector symbols can be changed by software.

ECDIS Chart 1: An ECDIS version of chart 1, including all symbols, line styles and colour coding used for both chart and navigation features. Intended for the mariner to both familiarize himself with ECDIS and to look up specific symbols. The manufacturer should program the look-up of symbols drawn from the Presentation Library, including certain diagrams which are copied from the paper chart INT 1.

Symbol Size: The size is specified in normalized units of 0.01 mm. The minimum dimension is always more than 4 mm. This size applies to display on a standard minimum screen specified in PC&SS (5) and S-52. The size should be enlarged in proportion to increase in side length for larger screens.

Look-up Table: a table that links SENC objects to area, point symbol and line representation on ECDIS, and provides display priorities, radar flag, IMO category and optional viewing groups.

# 18. CONTENTS OF THE DIGITAL PRESENTATION LIBRARY DISKS AND CD-ROM

Please see README file on individuals disks for file/data extraction and specific contents.

## 18.1 Official Presentation Library

The official Presentation Library is supplied in ".DAI" format, the name on the disk being PSLBmm_n.DAI, where mm_n is the edition/revision number. This file is formatted in accordance with the description given in section 10 of this manual and contains look-up tables, colour tables and symbol descriptions. This file is intended to be the up-dateable form of the Presentation Library.

## 18.2 Test Edition of the Presentation Library

A "Test Edition" of the Presentation Library (see section 8.3.5) is provided in a complete replacement .DAI file named PSLTmm_0.DAI, where mm is the edition number. The Test Edition uses a special test edition look-up table together with the regular colour tables and symbol library.

## 18.3 Look-up Table sets

The official look-up tables are included in the above-described PSLBmm_n.DAI file.

There are also unofficial expanded text copies of these tables on the distribution disks. These files are provided for ease of use and are not in the official updateable distribution format. These are not provided on the disk accompanying an immediate amendment.

## 18.4 Colour Tables

The official CIE colour tables are included in the above-described PSLBmm_n.DAI file.

There are also unofficial expanded text copies of these tables on the distribution disks. These are not provided on the disk accompanying an immediate amendment.

## 18.5 Symbols, Patterns and Linestyles

The official symbols, patterns and linestyles are provided in the PSLBmm_n.DAI file.

There are also unofficial individual text files for each symbol on the distribution disks for the purpose of browsing with a text editor or printing. These are not provided on the disk accompanying an immediate amendment.

For users who do not subscribe to the digital Presentation Library CD, the symbols, patterns and linestyles are available in the "hard copy addendum" to the Presentation Library, which is bound in with the "Colour & Symbols Specifications for ECDIS". This is not amended between new editions of the Presentation Library.

## 18.6 Conditional Symbology Procedures pseudo-code and program LITDSN

The disks contain pseudo-code generated by the software used to create the logic diagram conditional symbology procedures (but not the narrative conditional symbology procedures). This is for the convenience of users, but is not amended between new editions of the Presentation Library and is not provided on the immediate amendment disk. The authoritative version of the procedures is that given in the logic diagrams of section 12 of the Presentation Library Manual.

This section of the disk also contains a "C" function for the conditional symbology procedure LITDSN, which generates a light description in the form seen on the paper chart, and a "C" program “LITTST.C" to test the input and output of this function.

## 18.7 Presentation Library Manual

The Presentation Library Manual, in the form of a word processed file, is contained on the Presentation Library compact disk and is also supplied separately on disks in a pocket attached to the cover of S-52 Appendix 2 "Colour & Symbol Specifications for ECDIS". Both of these versions include figures for the manual and the Nassi & Schneidermann diagram conditional symbology procedures, as graphic files.

The Presentation Library Manual includes:

- the look-up tables and colour tables of the .DAI file, in text form,
- the diagram and narrative conditional symbology procedures, together with written symbolizing instructions (in section 8) for special IMO and IHO requirements which are needed to complete the symbolizing of an ENC,
- symbolizing instructions for using the above to display an S-57 ENC.

Note that the Presentation Library Manual disks do not contain the ECDIS Symbols. These are provided only:

1. in digital (vector) form on the .DAI file, and in expanded form on the compact disc,
2. in hard copy in the "hard copy addendum" to the Presentation Library, which is bound in with the "Colour & Symbol Specifications for ECDIS".

## 18.8 ECDIS Chart 1 and Colour Differentiation Test diagram

An ECDIS Chart 1 and a Colour Differentiation Test diagram are required for use by the mariner, off-line, as described in "Colour & Symbol Specifications for ECDIS" sections 3.1.4 and 5.2.5.

The distribution disks contain a set of S-57 files named AANC1XXX.000 ("N" is the navigational purpose), with AGEN code 1810, which carry the representation of the ECDIS Chart 1 and the Colour Test diagram. Packaged with them is a "Chart 1 version of the .DAI file" which contains the special look-up tables needed to symbolize Chart 1 and the Colour Test diagram.

Detailed specifications for these diagrams and their use are given in Part III section 3 of the Presentation Library.

Manufacturers who do not wish to subscribe to the digital Presentation Library should construct the ECDIS Chart 1 from the "Hard copy Addendum to the Presentation Library", published in the "Colour and Symbol Specifications for ECDIS.

# PART II

## MARINERS' NAVIGATIONAL OBJECTS

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This part of the manual was originally prepared by SevenCs Gmbh, Hamburg, on behalf of the Colours and Symbols Working Group of the International Hydrographic Organization, under contract to the Royal Australian Navy Hydrographic Service.

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## 1. INTRODUCTION

1.1 Under IMO PS section 8, the colours and symbols used to describe the "navigational elements and parameters for ECDIS" area the responsibility of the International Electrotechnical Commission (IEC), and the colours and symbols for chart information are the responsibility of the International Hydrographic Organization (IHO).

The navigational colours and symbols are published in "Electronic Chart Display and Information System (ECDIS)" - IEC Publication 1174; The chart colours and symbols are published by the IHO.

In the interest of safe navigation, through ensuring that symbology for navigational and for chart information are consistent with each other, and through making operation of ECDIS simpler and thus both more reliable and more user-friendly, both these types of colours and symbols are included in the IHO Presentation Library. The Presentation Library provides the means for symbolizing ECDIS information.

Although the Presentation Library will be updated, IEC 1174 remains the authority for navigational colours and symbols, and its latest edition should always be consulted for possible changes.

1.2 In the Presentation Library, the IEC "Mariners' Navigational Objects" (so-called to distinguish them from navigational aids such as buoys and lights and because information added by the mariner is included) are defined in the same "object class + attribute" classification used by the IHO to code chart data, but using lower case characters. For example the own ship's past track is classed as object class "pastrk" and the track produced by the secondary position finding system is distinguished as attribute "catpst 2".

This approach is taken in order to simplify ECDIS processing and user interaction.

Part 2 of the Presentation Library (this document) describes these mariners' objects. They can be symbolized in the same manner as chart objects by using Part 1 of the Presentation Library, which consists of colour tables, symbol tables and a look-up table linking the objects to these tables through symbolizing instructions. The ECDIS manufacturer should search the look-up table of the Presentation Library for the appropriate object class/attribute combination and thus find the instructions for symbolizing that object on the ECDIS display.

Note that the Presentation Library does not specify ECDIS functions such as route planning routines or the user interface. The manufacturer should develop his own routines, using the symbolizing instructions to display the results.

The own ship symbol and planned route are classified «DISPLAYBASE» and all other objects are classified «MARINERS STANDARD», or «MARINERS OTHER», meaning that the mariner can re-assign them as he wishes but that otherwise they default to «STANDARD» or «OTHER'.

## 2. EXPLANATIONS

This chapter contains the explanation of mariners' objects that are:

- tools for use in ECDIS chartwork,
- symbols for information added to the SENC by the mariner,
- lines and symbols used in chartwork,
- used in voyage planning.
- used to display own ship and other vessels on the ECDIS screen,

### 2.1. Tools

For working with ECDIS, navigational object classes that form tools for chartwork are provided.

The *cursor* is a pointing device that stands for a geographic position when it is placed on the chart display. Therefore the object class

- ***cursor*** ('cursor')

is provided.

For taking *measurements* the object class

- ***reference point*** ('refpnt')

is provided. The reference point is a tool that is placed at a geographic position to measure distance and bearing to the cursor position.

For *measuring or indicating distance and bearing* the classes

- ***variable range marker*** ('vrmark') and
- ***electronic bearing line*** ('ebline')

are provided. The variable range marker forms a ring or segment of a ring. The electronic bearing line can be rotated on either of its ends to measure bearings. Both can be controlled by the mariner in range, direction and point of origin. They can be placed e.g. on the reference point or the own ship's position.

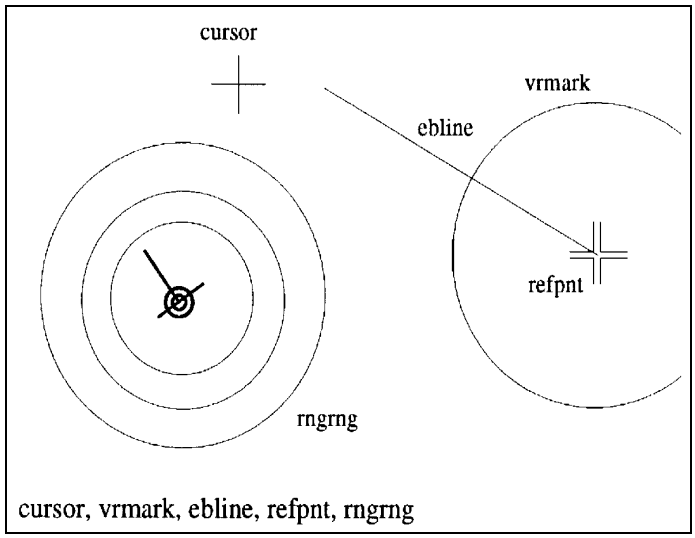
For marking distance relative to the own ship's position the class

- ***range ring*** ('rngrng')

is designed. Navigational objects of this class describe a fixed radius. To form a set of range rings, multiple objects of this class with different ranges can be combined.

Figure 1 shows the appearance of the tools for ECDIS chartwork. **Please note, that the actual symbolization defined by the Presentation Library differs from the symbolization shown in the following figures**.

**Fig. 1 - Tools for ECDIS Chartwork**




## 2.2. Chartwork

The mariner may put information on the chart. For this purpose the mariners' object class

- ***mariners' note*** ('marnot')

is designed. The text of the information is carried by the object's attribute *user's remark* ('usrmrk'). There are different types of 'marnot' objects distinguished by the attribute category *of mariners' note* ('catnot'):

A mariners' note may be a:

- *information:* general information or note of lower importance

- *caution:* important information, danger, order or instruction to be noticed by the mariner (e.g. "Call pilot")

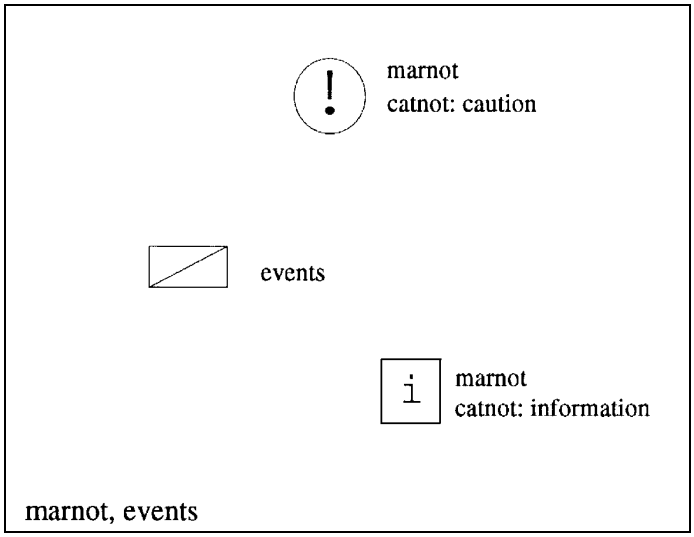
In case of an event during passage the mariner uses the mariners' object class

- ***event*** ('events')

This type of information is to be used during the monitoring of the voyage, e.g. in case of man over board.

Figure 2 shows the appearance of the different types of information.

**Fig. 2 - Information Objects**




The mariner may need to perform active chartwork like fixing positions, highlighting dangers, marking clearances or inserting observed features.

For fixing a position or line of position the navigational object classes

- ***position line*** (’poslin’) and ***position (’positn’)***

***are provided. The position fix object is used by the mariner e.g. to mark an observed position fix. A position line that is on its original location is distinguished from a transferred line by the value of the attribute*** *transfer status of position line* (’transf’).

For highlighting dangers the navigational object class

- ***danger highlight*** (’dnghlt’)

is designed.

A clearing line is an object of the class

- ***clearing line*** (’clrlin’).

To insert or "draw" mariners’ information on the chart the class

- ***mariners’ feature*** (’marfea’)

is designed. The mariner may add his own points, lines or areas to the display, in the same way that he might put additional features required for safe navigation on the paper chart. Additional information may be carried by the attribute *users’ remark* (’usrmrk’).

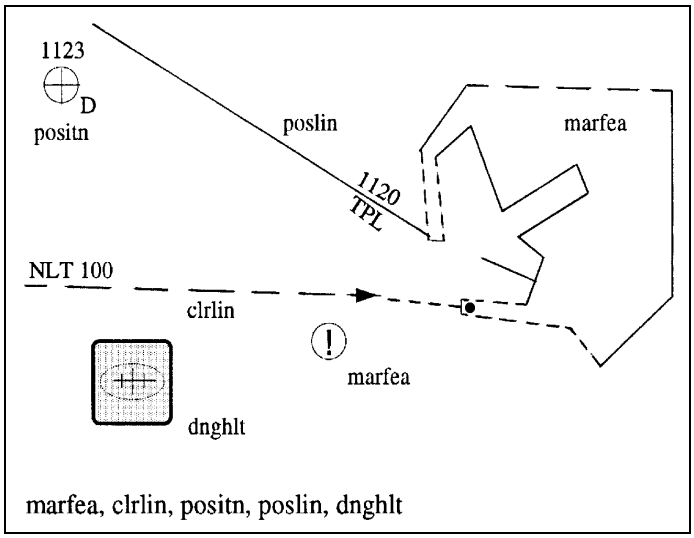
To insert or "draw" a manufacturers' feature on the chart the class

- ***manufacturers' feature*** ('mnufea')

is designed. The manufacturer may add his own points, lines or areas to the display.

Figure 3 shows the appearance of chartwork objects.

**Fig. 3 - Chartwork Objects**




## 2.3. Planning

Voyage planning is an essential part of the ECDIS functionality. For this purpose the following navigational object classes are designed:

- ***waypoint*** ('waypnt') — a waypoint is a point object which carries information about its use in navigation. It is the basic element of voyage planning.

- ***leg*** ('leglne'): — a leg connects a pair of waypoints. It may be a rhumb line or great circle, as defined by the value of the attribute *leg characteristic* ('legchr'). Whether a leg is selected as the planned route can be signaled by the value of the attribute *selection* ('select'). An alternate planned route is characterized by selecting the legs as "alternate".

- ***wheel-over-line*** ('wholin'): a wheel-over-line is a line object crossing a leg that marks a course change. The wheel-over-line is not part of the leg. Its position depends on the maneuverability of the ship in relation to her speed, the amount of rudder applied and the extent of the course change.

- ***planned route:*** a planned route is a series of two or more waypoints and one or more legs that are selected as planned. The waypoint at the end of one leg must be the beginning of the next leg.

- ***alternate route:*** an alternate route is a series of waypoints and legs selected as "alternate".

On the next page the elements of voyage planning are illustrated.

Figure 4 shows the waypoint, leg and wheel-over-line as elements of voyage planning.

**Fig. 4 - Elements of Voyage Planning**

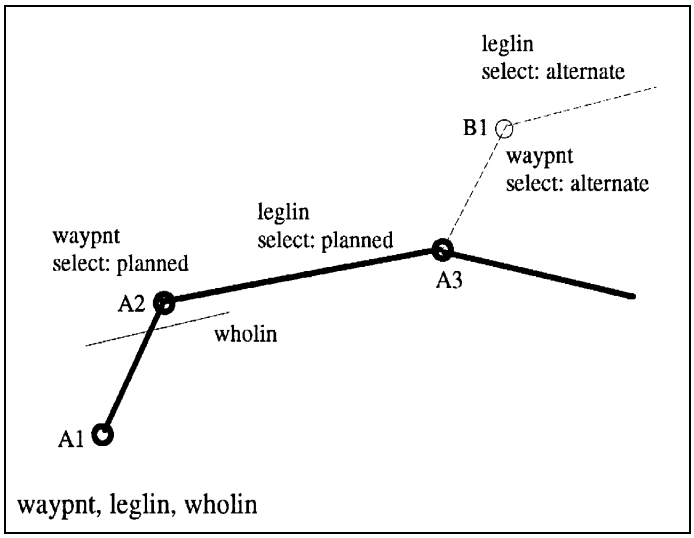
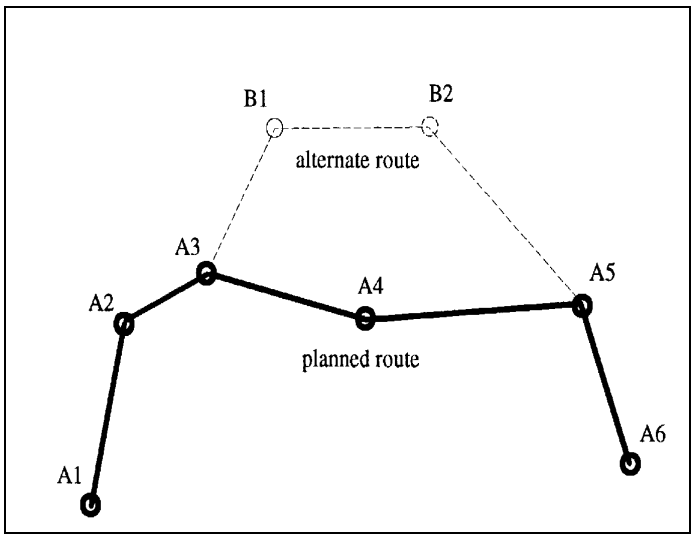


Figure 5 shows the possible appearance of routes.

**Fig. 5 - Routes**




## 2.4. Vessels

For all types of vessels which may be represented in ECDIS the navigational object classes

- ***own ship*** (’ownshp’)

- ***other vessels*** (’vessel’)

are designed.

These are two distinct classes of vessels:

1) the "own ship", which is the ECDIS users’ vessel and

2) "other vessels" that are acquired by radar, A.I.S., etc.

Information about the vessel’s course and speed over ground, heading etc. is carried by attributes 'headng', ‘cogcrs’ and ‘sogspd’ . The values of the attributes *ship’s length over all* ('shplen') and *ship’s breadth (beam)* ('shpbrd') may be used to draw the ownship symbol to scale on large scale displays.

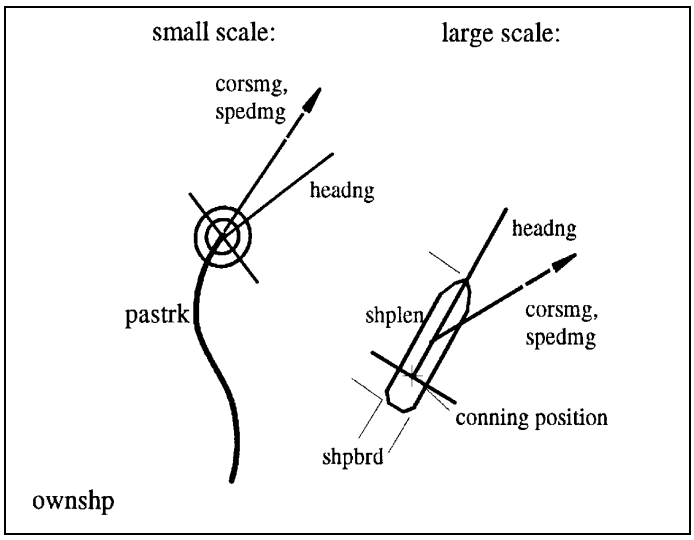
Tied to the own ship is a navigational object of the class

- ***past track*** ('pastrk')

which is the set of past positions. The past track may be generated by the primary positioning system and/or by the secondary positioning system.

Figure 6 shows the own ship as the symbol appears at different scales. The display of the heading line, the course -made-good-vector, the ship symbol and its interference is handled by a conditional symbology procedure.

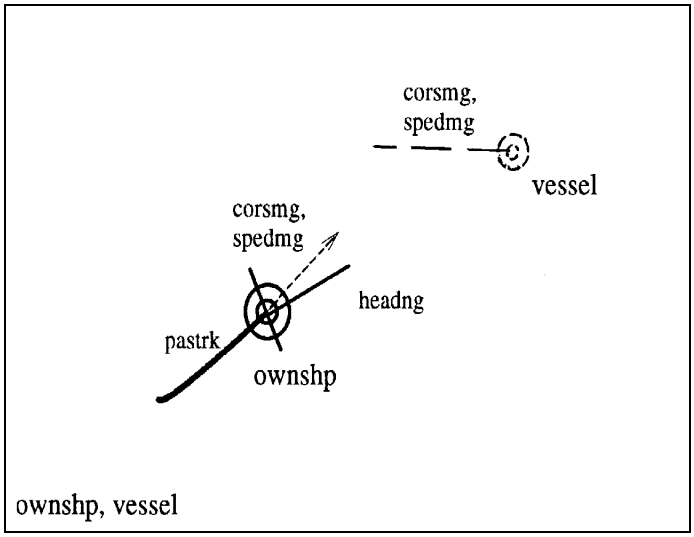
**Fig. 6 - Own Ship**




The object class 'vessel' is used to describe target vessels acquired by Radar/ARPA applications.

Figure 7 illustrates other vessels in ECDIS.

**Fig. 7 - Other Vessels**




**Note: the symbols used on the ECDIS differ from those shown above in many cases.**

## 3. MARINERS' OBJECT CLASSES

### 3.1. Form

Each navigational object class is specified according to a standardized form, which is the form for the class definition:

-Object Class: written name of the navigational object class

- Acronym: six-character acronym of class name; always lower case letters

-Code: integer code to be used for non-standard objects, according to S-57.

-Reference : reference to the IEC 1174 Annex E «Navigational Symbols» symbol number or other reason for the object

- For each navigational object class an individual set of relevant attributes is defined. This set is divided into three subsets:

* subset 'Attribute_A': applies to the individual characteristic of a certain object; e.g. whether planned route or alternate route.

* subset 'Attribute_B': applies to the future use of the data e.g. for presentation or for an information system; e.g. smallest display scale at which a certain symbol should be shown.

* subset 'Attribute_C': applies to data administration; e.g. date of establishing a certain planned route.

Each subset shows the list of Attribute - codes. For the description of each Attribute see Chapter 5.

- Geometric Primitive: indicates the allowable geometric forms. Point, line or area.

- Definition: Where possible each object class is defined using an existing definition, and the source is quoted.

- Remarks: Under 'Remarks' further comments and notes are given. Related but separate object classes are listed under the heading 'Distinction'.

## 3.2. Mariner's Object Classes: Overview

In the following list the codes of the object classes are in alphabetical order.

| Mariners' Object Class | Code | IEC | Page |
|---|---|---|---|
| Clearing line | clrlin | 15 | II-14 |
| Cursor | cursor | 5. | II-15 |
| Danger highlight | dnghlt | 14 | II-16 |
| Electronic bearing line | ebline | 4. | II-17 |
| Event | events | 6. | II-18 |
| Leg | leglin | 16. | II-19 |
| Mariners' feature | marfea | | II-20 |
| Mariners' Note | marnot | | II-21 |
| Manufacturers' feature | mnudea | | II-22 |
| Own ship | ownshp | 1a; 1b.; 3. | II-23 |
| Past track | pastrk | 2.1; 2.2 | II-24 |
| Planned position | plnpos | 19 | II-25 |
| Position | positn | 7.; 8. | II-26 |
| Position Line | poslin | 9.; 10. | II-27 |
| Cursor reference point | refpnt | | II-28 |
| Range ring | rngrng | | II-29 |
| Tidal stream or current vector | tidcur | 13 | II-30 |
| Vessel | vessel | | II-31 |
| Variable range marker | vrmark | 4. | II-32 |
| Waypoint | waypnt | 17 | II-33 |
| Wheel-over-line | wholin | . 21 | II-34 |

### 3.3. Cross-reference from " ECDIS Navigational Symbols", IEC 1174, Annex E

| IEC 1174 | | Mariners' Objects | | |
|---|---|---|---|---|
| **no.** | **description** | **Object class** | **Attribute** | **symbol & colour** |
| 1a | Ownship (double circle) | ownshp | conditional symbology procedure OWNSHP02 | OWNSHP02, SHIPS |
| 1b | Ownship (scaled outline) | ownshp | conditional symbology procedure OWNSHP02 | OWNSHP05, SHIPS |
| 2.1 | PastTrack Primary position system | pastrk | catpst1 conditional symbology procedure PASTRK00 | solid line, PSTRK |
| 2.2 | PastTrack Secondary position system | pastrk | catpst2 conditional symbology procedure PASTRK00 | solid line, SYTRK |
| 3.1, 3.2 | Vector for course & speed over ground and through the water | ownshp | conditional symbology procedure OWNSHP02 | OSPONE02, OSPSIX02, VECGND01, VECWTR01 solid line, SHIPS |
| 4 | Variable range marker | vrmark | conditional symbology procedure VRMEBL01 | NINFO ERBLNA01 ERBLNB01 |
| 4 | Electronic bearing line | ebline | conditional symbology procedure VRMEBL01 | NINFO ERBLNA01 ERBLNB01 |

| IEC 1174 | | Mariners' Objects | | |
|---|---|---|---|---|
| **no.** | **description** | **Object class** | **Attribute** | **symbol & colour** |
| 5 | Cursor | cursor | | CURSR<br>CURSRA01,<br>CURSRB01 |
| 6 | Event | events | OBJNAM | EVENTS02, NINFO |
| 7.1 | Dead-reckoning position | positn | pfmeth1 | POSITN02, NINFO |
| 7.2 | Estimated position | positn | pfmeth2 | POSITN02, NINFO |
| 8 | Position fixes methods V-T | positn | pfmeth3-15 | POSITN02, NINFO |
| 9 | Position line | poslin | transf1 | solid line, NINFO |
| 10 | Transferred position line | poslin | transf2 | solid line, NINFO |
| 11 | AIS vessel reports | vessel | conditional symbology procedure VESSEL01 | AISVES01, AISSLP01<br>AISONE01, AISSIX01<br>solid line, ARPAT |
| 12 | ARPA targets (Electronic Plotting Video Symbols) | vessel | conditional symbology procedure VESSEL01 | ARPATG01,<br>ARPONE01, ARPSIX01<br>VECGND21,<br>VECWTR21<br>solid line, ARPAT |
| 13.1 | Predicted tidal stream/current vector | tidcur | catcurl, ORIENT | TIDCUR01, NINFO |
| 13.2 | Actual tidal stream/current vector | tidcur | catcur2 | TIDCUR02, NINFO |
| 14 | Danger highlight | dnghlt | --- | DNGHILIT, DNGHL |
| 15 | Clearing line | clrlin | catclr, conditional symbology procedure | solid line, NINFO |
| 16a | Planned course & speed to make good | leglin | select1, conditional symbology procedure LEGLIN02 | heavy dotted line, PLRTE |
| 16b | Alternate route | leglin | select2 , | light dotted line, |

| IEC 1174 | | Mariners' Objects | | |
|---|---|---|---|---|
| **no.** | **description** | **Object class** | **Attribute** conditional symbology procedure LEGLIN02 | **symbol & colour** APLRT |
| 17 | Waypoint | waypnt | select, OBJNAM | PLRTE/APLRT |
| 18 | Distance to run | leglin | part of conditional symbology procedure | PLRTE/APLRT |
| 19 | Planned position | plnpos | plndat, ORIENT | PLRTE/APLRT |
| 20 | Light limit | LIGHTS | part of conditional symbology procedure | NINFO |
| 21 | Wheel over line | wholin | conditional symbology procedure | NINFO |

NOTE

The IEC Navigational Symbols, incorporated in IEC Publication 1174, are the authority for the above Mariners' Objects and the symbols in the Presentation Library.

The ECDIS manufacturer should refer to the latest edition of IEC 1174 to confirm the symbols given in the Presentation Library.

## 3.4 Mariners' Object Classes: Catalogue

Mariners' Object Class: **Clearing line**

Acronym: **clrlin** Code: 8193

Reference: IEC 1174 Annex E Section 15

Set Attribute_A: catclr;

Set Attribute_B: SCAMIN;;

Set Attribute_C: inptid;

Geometric Primitive: Line;

Definition:

Clearing line: A straight line constructed through suitably selected clearing marks so as to pass clear of certain dangers to navigation. (Bowditch, American Practical Navigator, Vol.2, DMA, Pub.No.9, 1981).

Remarks:

Distinction: 'ebline', 'poslin'

The attribute 'category of clearing line' carries the annotation:

"NMT" {bearing} "not more than {bearing}" or
"NLT" {bearing} "not less than {bearing}"

which means that the target object should always be kept outside the limits of this constraint. The bearing is calculated from the ship to the mark.

Mariners' Object Class: **Cursor**

Acronym: **cursor** Code: 8194

Reference: IEC 1174 Annex E Section 5

Set Attribute_A: cursty

Set Attribute_B:

Set Attribute_C:

Geometric Primitive: Point;

Definition:

A 'cursor' is used as a pointer for various purposes, e.g. establishing a waypoint; obtaining further information about a feature that the cursor is pointing at, such as a light; reading geographical coordinates; for bearing and distance measurements; and so on. It is moved by a pointing device such as trackball, mouse or arrow keys. While on the screen area of seachart presentation, the cursor refers to an absolute geographical position.

Remarks:

Distinction: 'refpnt'

Mariners' Object Class: **Danger highlight**

Acronym**:** **dnghlt** Code: 8195

Reference: IEC 1174 Annex E Section 14

Set Attribute_A:

Set Attribute_B: SCAMIN;;

Set Attribute_C: inptid;

Geometric Primitive: Point, Area;

Definition:

A 'danger highlight' is used by the mariner to draw attention to a hazard he believes to be dangerous to his ship.

Remarks:

Distinction: 'events', 'marfea', 'mnufea', 'refpnt'

Symbolization:

The symbol is a transparent red square or freely drawn polygon positioned by the mariner. It may be flashing, at the mariner's discretion. All underlying chart data should be clearly visible.

Mariners' Object Class: **Electronic bearing line**

Acronym: **ebline** Code: 8196

Reference: IEC 1174 Annex E Section 4

Set Attribute_A:

Set Attribute_B:

Set Attribute_C:

Geometric Primitive: Line;

Definition:

An 'electronic bearing line' is a rotatable line used for bearing marking or measurement.

Remarks:

Distinction: 'clrlin', 'poslin'

The electronic bearing line may be ship centred or freely movable.

Mariners' Object Class: **Event**

Acronym: **events** Code: 8197

Reference: IEC 1174 Annex E Section 6

Set Attribute_A: OBJNAM;

Set Attribute_B: SCAMIN;; usrmrk;

Set Attribute_C: inptid; loctim;

Geometric Primitive: Point;

Definition:

An event marks the ship's position at the instant the mariner detects an event.

Remarks:

Distinction: 'marnot'

The event object is solely applicable during route monitoring.

Symbolization:

The symbol may be numbered and have additional text such as time or "MOB" (man over board) associated with it.

Mariners' Object Class: **Leg**

Acronym: **leglin** Code: 8198

Reference: IEC 1174 Annex E Section 16, 17, 18, 19

Set Attribute_A: legchr; plnspd; select;

Set Attribute_B:

Set Attribute_C: inptid;

Geometric Primitive: Line;

Definition:

A 'leg' is a line which connects two waypoints. A series of waypoints and legs makes up a route.

Remarks:

The attribute 'select' should be used to distinguish planned and alternate routes and their legs.
The attribute 'legchr' should be used to distinguish great circle routes.
Course and distance of a legline are calculated from the geometric primitive and therefore need no attribute.

Symbolization:

The colour for the selected planned route is PLRTE. For the alternate planned route it is APLRT.

As required by the mariner, the ECDIS voyage planning system should:
(a.) Annotate each leg with planned course (always 3 digits) and speed to make good. Speed is shown in a box () {SY(PLNSPD03) or SY(PLNSPD04)}.
(b.) Mark the distance to run in nautical miles () SY (PLNPOSO2).
(c.) Mark the planned position, with date and time enclosed in an ellipse. {SY(PLNPOS01)}.

A leg which belongs to an alternate route is displayed as a orange dotted line (APLRT). A leg which belongs to a planned route is displayed as a heavy red dotted line (PLRTE).

Mariners' Object Class:**Mariners' feature**

Acronym: **marfea** Code: 8199

Reference: To meet the requirement of IMO PS 1.6, and of IHO S-52 sections 1.1 and 5.5

Set Attribute_A: OBJNAM;

Set Attribute_B: SCAMIN;; usrmrk;

Set Attribute_C: inptid; RECDAT; loctim;

Geometric Primitive: Area; Line; Point;

Definition:

A 'mariners' feature' is a feature added to the SENC by the mariner. Examples are a mariners' caution or information symbol referring to a real object, or additional chart information from his own observation, or from a pilot or other reliable source..

Remarks:

Distinction: 'dnghlt', 'marnot', 'mnufea', 'positn'

A "danger highlight" shall solely be used to define an existing chart feature believed to be dangerous. The mariners' feature is used by the mariner also for observation report purposes. Whilst a 'mariners' note' consists of text written on the display, the 'mariners' feature' may consist of symbols, lines or areas drawn interactively by the mariner, as he does on the paper chart.

Symbolization:

The colour allocated to mariners' features is NINFO.

point feature: an exclamation mark in a circle or a small letter "I" in a box or any chart symbol in orange.

line feature: solid or dashed line, NINFO, 1 or 2 pixels wide.

area feature: if a filled area is required, use area fill, , 75% transparency, ADINF {AC(ADINF,3)}.

Chart features drawn by the mariner should be distinguished as described in Part1 Section 8.7 of this document.

Mariners' Object Class: **Mariners' Note**

Acronym: **marnot** Code: 8200

Reference: To meet the requirements of IMO PS 1.6

Set Attribute_A: catnot;

Set Attribute_B: SCAMIN;; usrmrk;

Set Attribute_C: inptid; RECDAT;

Geometric Primitive: Point;

Definition:

A 'mariners' note' is textual information defined by the mariner which is related to a certain geographic position.

Remarks:

Distinction: 'events', 'marfea', 'mnufea'

The attribute 'category of mariners' note' ('catnot') classifies the stored textual information according to the importance, that is whether it is a "caution" or "information" note.

Symbolization:

An exclamation mark in a circle or a small letter "I" in a rectangle, SY(CHINFO08) or SY(CONF.), colour NINFO.

Mariners' Object Class: **Manufacturers' feature**

Acronym: **mnufea** Code: 8201

Reference: To implement IMO PS section 2 : "The SENC may also contain information from other sources", and IHO S-52 section 2 : "Additional information obtained from other sources should be distinguished from HO data."

Set Attribute_A: OBJNAM;

Set Attribute_B: SCAMIN;; usrmrk;

Set Attribute_C: RECDAT;

Geometric Primitive: Area; Line; Point;

Definition:

A feature or information added by the manufacturer of the ECDlS. Examples are a caution or information symbol for cursor picking to read out the information on the alphanumeric display; additional chart information not available in the ENC; manufacturers' value-added feature; etc.

Remarks:

Distinction : 'marfea', 'marnot', 'dnghlt'

Symbolization:

The colour allocated to all manufacturers' information is ADINF.

Point feature: the caution or information symbol; SY(CHINFO10) or SY(CHINFO11) or manufacturer-provided chart information, distinguished from HO data by the colour ADINF.

Line feature: solid line, 1 or 2 pixels wide, for manufacturers' non-chart information; or manufacturer-provided chart information in HO chart linestyles, distinguished from HO data as described in Part 1 Section 8.7 of this document.

Area feature: area outlined by a solid line, 2 pixels wide, for manufacturers' non-chart information; or manufacturers' chart information symbolized as for HO chart areas, distinguished from HO data as described in Part 1 Section 8.7 of this document.

Note that manufacturers' areas, whether non-chart or chart areas, should not use area colour fill.

Mariners' Object Class: **Own ship**

Acronym: **ownshp** Code: 8202

Reference: IEC 1174 Annex E Section 1

Set Attribute_A: cogcrs; headng; sogspd; shpbrd; shplen; ctwcrs; stwspd; vecper; vecmrk; vecstb

Set Attribute_B:

Set Attribute_C:

Geometric Primitive: Point;

Definition:

The "own ship" is the ECDIS user's ship and the pivot point is the conning position, which is where the mariner controls the ship. The conning position and the position of the navigation system antenna will seldom coincide.

Remarks:

Distinction: 'vessel'

Symbolization:

The ship's position must first be adjusted for the offset between the navigating antenna and the conning position. Two symbols are available for own ship, at mariners' option:

(a.) Two concentric circles.
(b.) A symbol representative of the own ship's outline, drawn to indicate the length and breadth (beam) of the ship at the scale of the ECDIS display.
This scaled symbol should only be used if the scaled ship's length is not less than 6 mm.

In drawing the outline of the ship, the offset of the conning position from the artificial pivot point in the centre of the scaled ship symbol must be taken into account.

Both these symbols include the optional heading and beam bearing lines..

The symbolization of own ship is ruled by a conditional symbology procedure which also applies the course & speed vector and selects the own ship symbol or the scaled ship symbol depending on the mariner's selection, so long as the scaled symbol is at least 6 mm long.

Mariners' Object Class: **Past track**

Acronym: **pastrk** Code: 8203

Reference: IEC 1174 Annex E Section 2

Set Attribute_A: catpst; pfmeth

Set Attribute_B:

Set Attribute_C: RECDAT; loctim;

Geometric Primitive: Line;

Definition:

[Past-]Track: The actual path of a vessel over the ground, such as may be determined by tracking. (Bowditch, American Practical Navigator, Vol.2, DMA, Pub.No.9, 1981).

Remarks:

The past track refers to the own ship. The attribute 'category of past track' indicates whether the past track is derived from the primary or the secondary navigational sensor.

Symbolization:

The past track is symbolized by a solid line, colour PSTRK or SYTRK, depending on the attribute catpst. The ECDIS should provide labeled time marks, as selected by the mariner. Time to be HHMM or MM.

Mariners' Object Class: **Planned position**

Acronym: **plnpos** Code: 8204

Reference: IEC 1174 Annex E Section 19

Set Attribute_A: ORIENT;

Set Attribute_B: SCAMIN;;

Set Attribute_C: inptid; plndat;

Geometric Primitive: Point;

Definition:

A planned position marks the position on a leg where the own ship shall be at a certain date and time.

Remarks:

Distinctions: 'positn', 'refpnt', 'waypnt'

The 'planned position' is used to mark a planned position on a legline according to a sailing schedule.

Symbolization:

As required by the mariner, the ECDIS voyage planning system should mark the planned position with a dash crossing the leg line, with date and time enclosed in an ellipse. ) (SY(PLNPOS01).

Mariners' Object Class: **Position**

Acronym: **positn** Code: 8205

Reference: IEC 1174 Annex E Sections 7, 8

Set Attribute_A: pfmeth;

Set Attribute_B: SCAMIN;;

Set Attribute_C: inptid; loctim;

Geometric Primitive: Point;

Definition:

An ECDIS position is based on either dead reckoning, estimated position including the effect of currents, or observation of celestial or terrestrial objects or of an electronic position finding system.

Remarks:

Distinction: 'plnpos', 'refpnt'

Mariners' Object Class: **Position Line**

Acronym: **poslin** Code: 8206

Reference: IEC 1174 Annex E Section 9, 10

Set Attribute_A: transf;

Set Attribute_B: SCAMIN;;

Set Attribute_C: inptid; loctim;

Geometric Primitive: Line;

Definition:

Position line : A line indicating a series of possible positions of a craft, determined by observation or measurement. (Bowditch, American Practical Navigator, Vol.2, DMA, Pub.No.9, 1981).

Remarks:

Distinction: 'ebline', 'leglin', 'clrlin', 'wholin'

Whether a position line is transferred or not is indicated by the value of the attribute 'transf'.

Symbolization:

The ECDIS should provide a time label, and a notation "TPL" on a transferred position line, as required by the mariner.

Mariners' Object Class: **Cursor reference point**

Acronym: **refpnt** Code: 8207

Reference: To meet the requirements of IMO PS 1.6

Set Attribute_A:

Set Attribute_B:

Set Attribute_C:

Geometric Primitive: Point;

Definition:

A 'cursor reference point' is a geographical position marked by the mariner with the cursor for reference purposes, e.g. measuring distance and bearing.

Remarks:

Distinction: 'cursor', 'dnghlt', 'plnpos', 'positn', 'waypnt'

The reference point is a tool for doing chartwork.

Mariners' Object Class: **Range ring**

Acronym: **rngrng** Code: 8208

Reference: To meet the requirements of IMO PS 1.6

Set Attribute_A:

Set Attribute_B:

Set Attribute_C:

Geometric Primitive: Line;

Definition:

A 'range ring' is a circle with a defined radius located with its centre at the position of the own ship.

Remarks:

Distinction: 'vrmark'

Range rings with different radii are used to mark fix distances from a vessel.

Symbolization:

A circle LS(SOLD,1,NINFO)

Mariners' Object Class: **Tidal stream or current vector**

Acronym: **tidcur** Code: 8209

Reference: IEC 1174 Annex E Section 13

Set Attribute_A: catcur; curstr; ORIENT;

Set Attribute_B: SCAMIN;;

Set Attribute_C: inptid; loctim;

Geometric Primitive: Point;

Definition:

The "tidal stream or current vector" describes a predicted or actual, observed or measured tidal stream or current.

Distinction:

S-57 objects TS_FEB, TS_PRH, TS_PNH, TS_PAD, TS_TIS

Remarks:

The tidal stream or current vector describes the current observed or deduced by the mariner or calculated by a tide prediction system at a certain time at a certain position.
«Tidcur» refers to tidal stream or current information other than that contained in the ENC.

Mariners' Object Class: **Vessel**

Acronym: **vessel** Code: 8210

Reference: Required under IMO PS section 6 to ensure that symbols representing another vessel input from ARPA or other source are consistent with SENC information on the ECDIS display.

Set Attribute_A: cogcrs; sogspd; ctwcrs; stwspd; vesrce; vestat; vecper; vecmrk; vecstb

Set Attribute_B: SCAMIN;;

Set Attribute_C: RECDAT; loctim;

Geometric Primitive: Point;

Definition:

The 'vessel' is any ship about which information is available (e.g. by means of ARPA measurement).

Remarks:

Distinction: 'ownshp'

Mariners' Object Class: **Variable range marker**

Acronym: **vrmark** Code: 8211

Reference: IEC 1174 Annex E Section 4

Set Attribute_A:

Set Attribute_B:

Set Attribute_C:

Geometric Primitive: Line;

Definition:

The 'variable range marker' is a range ring, the radius of which is continuously adjustable. Alternatively, it is the range mark on an electronic range and bearing line.

Remarks:

Distinction: 'rngrng'

The variable range marker may be ship centred or freely movable.

Mariners' Object Class: **Waypoint**

Acronym: **waypnt** Code: 8212

Reference: IEC 1174 Annex E Section 17

Set Attribute_A: OBJNAM; rudang; select; trnrad;

Set Attribute_B: usrmrk;

Set Attribute_C: inptid;

Geometric Primitive: Point;

Definition:

A 'waypoint' is a freely defined geographical point which may be independent of a certain leg.

Remarks:

Distinction: 'plnpos', 'refpnt'

There may be more attributes added to fit the needs of trackkeeping systems and transfer parameter data which may be calculated by the voyage-planning system. The attributes above should be the only ones with values that have to be defined by the mariner.

The attribute select is used to distinguish planned and alternate waypoints.

Waypoints have spatial relations to leg lines so that they may define the beginnings or ends of legs.

Symbolization:

Waypoints may be labeled. The label must be unique. The first character must be a letter, but not "o", "I" or "z". Its colour depends whether it belongs to a planned or an alternate route.

Mariners' Object Class: **Wheel-over-line**

Acronym: **wholin** Code: 8213

Reference: IEC 1174 Annex E Section 21

Set Attribute_A: ORIENT;

Set Attribute_B: SCAMIN;; usrmrk;

Set Attribute_C: loctim;

Geometric Primitive: Line;

Definition:

The wheel over line is the line drawn parallel to the next leg so that it intersects with the current leg and defines the point at which the turn should be started in order to accurately attain the next leg.

Remarks:

Distinction: 'poslin'

The point of intersection of the wheel over line and the current leg will be governed by rudder angle, turning radius, wind speed and direction and tidal stream rate and direction.

Symbolization:

The wheel-over-line is symbolized by a solid orange line.

# 4. NAVIGATIONAL ATTRIBUTES

## 4.1 Form

Each 'Navigational Attribute' is specified using a standardized form. The usage of the form format will depend upon the attributes' description requirements. (The form and definitions are taken as far as possible from S-57,):

- Attribute: descriptor of the attribute class
- Acronym: six-character coding of attribute class name in lower case letters
- Code: integer code to be used for non-standard objects, according to S-57.
- Reference: reference to the IEC symbol number or other authority
- Input Type: one-character code of attribute class (see [S-57, A-3.1]):

  * discrete value type: 'E' (for 'enumeration')
  * float data type: 'F' (for 'float number')
  * integer data type: 'I' (for 'integer number')
  * coded string type: 'A' (for 'ASCII')
  * free text format type: 'S' (for 'string')

- Expected Input: depending on the input type, two different forms appear:

  * for 'E'-type attributes a list of ID-numbers with associated, defined meanings is given.
  * for 'A', 'F', 'I' and 'S'-type attributes the expected input is indicated.

- Remarks: under 'Remarks' further comments and notes are given. The description of the expected input or the definitions which are associated with that attribute are also given. For some attributes, official definitions are given.

## 4.2 Navigational Attributes: Overview

In the following list the codes of the attributes are in alphabetical order.


| Navigational Attribute | Code | Page |
|---|---|---|
| Category of clearing line | catclr | II-38 |
| Category of current and tidal stream | catcur | II-39 |
| Category of mariners' note | catnot | II-40 |
| Category of past track | catpst | II-41 |
| Course over ground | cogcrs | II-42 |
| Course through water | ctwcrs | II-43 |
| Current strength | curstr | II-44 |
| Cursor style | cursty | II-45 |
| Heading | headng | II-46 |
| Input identifier | inptid | II-47 |
| Leg characteristic | legchr | II-48 |
| Local time | loctim | II-49 |
| Position finding method | pfmeth | II-50 |
| Planned speed to make good | plnspd | II-51 |
| Planned date | plndat | II-52 |
| Rudder angle | rudang | II-53 |
| Selection | select | II-54 |
| Ship's breadth (beam) | shpbrd | II-55 |
| Ship's length over all | shplen | II-56 |
| Speed over ground | sogspd | II-57 |
| Speed through water | stwspd | II-58 |
| Transfer status of position line | transf | II-59 |
| Turning radius | trnrad | II-60 |
| User's remark | usrmrk | II-61 |
| Vector length time-period | vecper | II-62 |
| Vector time-mark interval | vecmrk | II-63 |
| Vector Stabilization | vecstb | II-64 |
| Vessel report source | vesrce | II-65 |
| Vessel Status | vestat | II-66 |

**4.3 Navigational Attributes: Catalogue**

# DELETED - DO NOT USE

Attribute: **ARPA acquisition state of vessel**

Acronym: **arpsta** Code: 8193

Reference: IEC 872 amendment, latest version. (symbol number refer to version 1991-06)

Input type: E

Expected Input:

| ID | Meaning |
|---|---|
| 0 | undefined |
| 1 | tracked ARPA target, initial stage before steady state (IEC symbol 3) |
| 2 | acquired ARPA target (as in IEC symbols 4, 5,6) |
| 3 | ARPA target at past position (IEC symbol 6) |
| 4 | ARPA target inside guard zone (IEC symbol 7) |
| 5 | ARPA target with CPA/TCPA warning (IEC symbol 8) |
| 6 | lost ARPA target (IEC symbol 9) |
| 7 | ARPA target with data requirements (IEC symbol 12) |

Remarks:

The attribute 'acquisition state of vessel' specifies the different categories of an ARPA target.

These IEC ARPA symbols are included to ensure that their presentation on the ECDIS display is consistent in size and colour with symbols for objects from the SENC.

# DELETED - DO NOT USE

(IEC 1174 does not distinguish ARPA acquisition state)

Attribute: **Category of clearing line**

Acronym: **catclr** Code: 8194

Reference: IEC 1174 Annex E Section 15

Input type: E

Expected Input:

| ID | Meaning |
|---|---|
| 0 | undefined |
| 1 | NMT (not more than) |
| 2 | NLT (not less than) |

Remarks:

The attribute 'category of clearing line' describes the condition associated with the clearing line:

"NMT" means that in order to clear the danger, the bearing of the mark should be " not more than" the indicated value.

"NLT" means the bearing of the mark should not be "not less than" the indicated value.

Attribute: **Category of current and tidal stream**

Acronym: **catcur** Code: 8195

Reference: IEC 1174 Annex E Section 13

Input type: E

Expected Input:

| ID | Meaning |
|---|---|
| 0 | undefined |
| 1 | predicted |
| 2 | actual |

Remarks:

Current and tidal stream may be predicted from tidal database or measured from available sensor information.

Attribute: **Category of mariners' note**

Acronym: **catnot** Code: 8196

Reference: Requirements of IMO PS 1.6

Input type: E

Expected Input:

| ID | Meaning |
|---|---|
| 0 | undefined |
| 1 | information |
| 2 | caution |

Remarks:

The attribute 'category of mariners' note' depends on the importance of the information:

- A caution contains information about a danger, or instructions or advice.
- Information is any note containing other information.

Attribute: **Category of past track**

Acronym: **catpst** Code: 8197

Reference: IEC 1174 Annex E Section 2

Input type: E

Expected Input:

| ID | Meaning |
|---|---|
| 0 | undefined |
| 1 | primary |
| 2 | secondary |

Remarks:

The attribute 'category of past track' indicates whether the past track is derived from the primary or the secondary position finding system.

Attribute: **Course over ground**

Acronym: **cogcrs** Code: 8215

Reference: IEC 1174 Annex E Section 3, 11 & 12

Input type: F

Expected Input:

Specific value for course over the ground in degrees.

Remarks:

Distinction: 'headng'
'ctwcrs'

The attribute 'course over ground ' specifies the value of the true course over the ground (course made good). For ownship, ECDIS or the position finding system should automatically input the specific value for the course made good from measurements.

Attribute: **Course through water**

Acronym: **ctwcrs** Code: 8216

Reference: IEC 1174 Annex E

Input type: I

Indication: Unit degrees (deg)
Resolution one deg

Format: xxx

Example: 315 for a course through the water of 315 deg.

Remarks:

The attribute «ctwcrs» is used to construct a water stabilized vector for own-ship or other vessel, if selected by the mariner.
The ECDIS should input the specific value for «ctwcrs» for own-ship from the compass.

Distinction: 'headng' («ctwcrs» is a smoothed version of the «headng»)
'cogcrs'

Attribute: **Current strength**

Acronym: **curstr** Code: 8199

Reference: IEC 1174 Annex E Section 13

Input type: F

Expected Input:

Specific value for the strength of the current or tidal stream in knots.

Remarks:

The attribute 'strength of current' specifies the strength (speed) of the current or tidal stream in knots. This may be deduced from sensor information, or predicted.

Attribute: **Cursor style**

Acronym: **cursty** Code: 8217

Reference: IEC 1174 Annex E, section 5

Input type: E

Expected Input:

| ID | Meaning |
|---|---|
| 1 | solid cursor, style A |
| 2 | open centred cursor, style B |

Remarks:

IEC 1174 defines the above two options for cursor style.

Attribute: **Heading**

Acronym: **headng** Code: 8211

Reference: CIRM symbol 1

Input type: F

Expected Input:

Specific value for true heading in degrees.

Remarks:

Distinction: ”
‘cogcrs’
‘ctwcrs’

Heading: the horizontal direction in which a ship actually points or heads at any instant, expressed in angular units from a reference direction, usually from 000° at the reference direction clockwise through 360°. (Bowditch, American Practical Navigator, Vol.2, DMA, Pub.No.9, 1981).

For the ECDIS application true north is the reference direction. The heading will normally be input automatically from the compass.

Attribute: **Input identifier**

Acronym: **inptid** Code: 8201

Reference: Requirements of IMO PS 1.6

Input type: S

Expected Input:

Specific value of input identifier (name or initials).

Remarks:

Distinction: 'OBJNAM'

The attribute 'input identifier' is used for identification of the originator of a certain mariners' object, e.g. to identify the mariner who marked a danger highlight or who planned a route.

Attribute: **Leg characteristic**

Acronym: **legchr** Code: 8203

Reference:

Input type: E

Expected Input:

| ID | Meaning |
|---|---|
| 0 | undefined |
| 1 | rhumb line |
| 2 | great circle (geodesic) |

Remarks:

The attribute 'leg characteristic' specifies whether a leg is a rhumb line or a great circle.

Attribute: **Local time**

Acronym: **loctim** Code: 8202

Reference: IEC 1174 Annex E Section 2, 7, 8, 9, 13,19

Input type: A

Expected Input:

Specific value for time indication in format HHMM or MM.

Remarks:

Distinction: 'plndat'

The attribute 'local time' represents the local time of making an observation or of predicted arrival at a point, etc.

Attribute: **Position finding method**

Acronym: **pfmeth** Code: 8204

Reference: IEC 1174 Annex E Section 7 and 8

Input type: E

Expected Input:

| ID | Meaning |
|---|---|
| 0 | undefined |
| 1 | dead reckoning |
| 2 | estimated |
| 3 | visual |
| 4 | astronomical |
| 5 | RADAR |
| 6 | Decca |
| 7 | GPS |
| 8 | Glonass |
| 9 | Loran/Tchaika |
| 10 | MFDF |
| 11 | Omega |
| 12 | Transit/Tsikada |
| 13 | dGPS |
| 14 | dGlonass |
| 15 | dOmega |
| 16 | dLoran |
| 17 | dDecca |
| 18 | Hi-Fix |
| 19 | Syledis |
| 20 | Microwave |
| 21 | Radar transponder |

Remarks:

The attribute 'position finding method' specifies the type of navigational sensor or the method by which a certain position is derived.

Attribute: **Planned speed to make good**

Acronym: **plnspd** Code: 8205

Reference: IEC 1174 Annex E Section 16

Input type: F

Expected Input:

Specific value of the planned speed in knots.

Remarks:

Distinction: ”
‘sogspd’
‘stwspd’

The attribute 'planned speed' specifies the planned speed to make good for a certain leg in knots. The planned speed should be shown in a box.

Attribute: **Planned date**

Acronym: **plndat** Code: 8206

Reference: IEC 1174 Annex E Section 18

Input type: F

Expected Input:

Specific value of the planned date and time in a standard time and date format including the time zone as a option, e.g., "20/1115" (+5).

Remarks:

Distinction: 'loctim', 'RECDAT'

The attribute 'planned date' specifies the planned date and time according to a schedule.

Attribute: **Rudder angle**

Acronym: **rudang** Code: 8207

Reference: IEC 1174 Annex E Section 21

Input type: I

Expected Input:

Specific value for rudder angle in degrees starboard or port.

Remarks:

The attribute 'rudder angle' specifies the value of the actual or desired rudder angle in degrees.

Attribute: **Selection**

Acronym: **select** Code: 8208

Reference: 16-19

Input type: E

Expected Input:

| ID | Meaning |
|---|---|
| 0 | undefined |
| 1 | planned |
| 2 | alternate |

Remarks:

The attribute 'selection' specifies whether a leg or waypoint is part of the planned route or part of the alternate route.

Attribute: **Ship's breadth (beam)**

Acronym: **shpbrd** Code: 8209

Reference: IEC 1174 Annex E Section 1

Input type: F

Expected Input:

Specific value for the ship's breadth (beam) in metres.

Remarks:

Distinction: 'shplen'

The attribute 'ship's breadth' specifies the value of the own ship's breadth in metres.

Attribute: **Ship's length over all**

Acronym: **shplen** Code: 8210

Reference: IEC 1174 Annex E Section 1

Input type: F

Expected Input:

Specific value for ship's length over all in metres.

Remarks:

Distinction: 'shpbrd'

The attribute 'ship's length over all' specifies the value of the own ship's length over all in metres.

Attribute: **Speed over ground**

Acronym: **sogspd** Code: 8218

Reference: IEC 1174 Annex E Section 3, 11 & 12

Input type: F

Indication: Unit Knots (kn)
Resolution 0.1 kn

Format: xx.x

Example: 12.5 for a speed over the ground of 12.5 kn.

Remarks:

Distinction: plnspd'
'stwspd'

The attribute 'speed over ground ' specifies the value of the ship's speed made good over the ground.

Attribute: **Speed through water**

Acronym: **stwspd** Code: 8219

Reference: IEC 1174 Annex E Sections 3, 11 & 12

Input type: F

Indication: Unit knots (kn)
Resolution 0.1 kn

Format: xx.x

Example: 12.5 a speed through the water of 12.5

Remarks:

The attribute «stwspd» is used to construct a water stabilized vector for own-ship or other vessel, if selected by the mariner.

The ECDIS should input the specific value for «stwspd» for own-ship from a water-track speed log..

Distinction: ‘plnspd’
‘sogspd’

Attribute: **Transfer status of position line**

Acronym: **transf** Code: 8212

Reference: IEC 1174 Annex E Section 8,9

Input type: E

Expected Input:

| ID | Meaning |
|---|---|
| 0 | undefined |
| 1 | original position |
| 2 | transferred position |

Remarks:

The attribute 'transfer status of position line' identifies whether a line of position is transferred or not.

Attribute: **Turning radius**

Acronym: **trnrad** Code: 8213

Reference: Requirements of IMO PS 1.6

Input type: F

Expected Input:

Specific value of the turning radius in nautical miles.

Remarks:

The attribute 'turning radius' specifies the turning radius at a waypoint in nautical miles.

Attribute: **Users' remark**

Acronym: **usrmrk** Code: 8214

Reference: Requirements of IMO PS 1.6

Input type: S

Expected Input:

Text string for users' remark.

Remarks:

The attribute 'users' remark' contains information, or annotation made by the mariner.

Attribute: **Vector-length time-period**

Acronym: **vecper** Code: 8220

Reference: IEC 1174 Annex E

Input type: I

Indication: Unit: minutes (min)
Resolution: 1 min

Format: xxx

Example: 12 for a 12 min vector-length period

Remarks:

The attribute «vecper' defines the time period which, multiplied by the speed («sogspd» or «stwspd»), determines the length of the own-ship or other vessel vectors.

Attribute: **Vector time-mark interval**

Acronym: **vecmrk** Code: 8221

Reference: IEC 1174 Annex E

Input type: E

Expected Input:

| ID | Meaning |
|---|---|
| 1 | time-mark every minute, with a highlighted time-mark every six minutes. |
| 2 | only highlighted time-mark every six minutes. |

Remarks:

The attribute «vecmrk» defines whether the mariner has selected one minute or six-minute time marks.

Attribute: **Vector Stabilization**

Acronym: **vecstb** Code: 8222

Reference: IEC 1174 Annex E Sections 3 and 11

Input type: E

Expected Input:

| ID | Meaning |
|---|---|
| 1 | ground stabilized |
| 2 | water stabilized |

Remarks:

The attribute ‘vecstb’ describes whether an own-ship or other vessel vector is ground or water stabilized.

Attribute: **Vessel report source**

Acronym: **vesrce** Code: 8223

Reference: IEC 1174 Annex E

Input type: E

Expected Input:

| ID | Meaning |
|---|---|
| 1 | ARPA target |
| 2 | AIS vessel report |
| 3 | VTS report |

Remarks:

The attribute «vesrce» identifies the source of information about a vessel other than own-ship.

Attribute: **Vessel Status**

Acronym: **vestat** Code: 8224

Reference: IEC 1174 Annex E

Input type: E

Expected Input:

| ID | Meaning |
|---|---|
| 1 | active, meaning shown with large symbol plus vector and/or heading line |
| 2 | sleeping, meaning small vessel symbol shown alone, oriented in direction «headng» but with no heading line. |

Remarks:

The attribute «vestat» defines whether an AIS vessel report is «active» or «sleeping» as defined above.

## 4.4 TEXT

Text should be written in black using letter prefixes or suffixes to prevent any confusion with soundings, as explained in section 7.1.3 Part I of this document

## 5. REFERENCES

[Glossary] "Glossary of ECDIS-related terms". Appendix 3 to International Hydrographic Organization (IHO) S-52. Latest edition.

[IEC 872] "Marine automatic radar plotting aids (ARPA)". Amendment 1, 1991-06, to International Electro-technical Commission (IEC) Publication 872, 1987. (Under revision as publication 936 in 1996)

[IEC 1174] "Electronic Chart Display and Information System (ECDIS)". Publication 1174 of the IEC. Latest edition.

[IMO PS] IMO A.817 (19) "Performance Standards for Electronic Chart Display and Information System (ECDIS)". IMO. Latest edition.

[C&SS] "Colour & Symbol Specifications for ECDIS". Appendix 2 to IHO S-52. Latest edition.

[Preslib] "IHO ECDIS Presentation Library". Annex A Part 1 to Appendix 2 to IHO S-52. Latest edition.

[S-52] "Specifications for Chart Content and Display Aspects of ECDIS". IHO Special Publication S-52. Latest edition.

[S-57] "Transfer Standard for Digital Hydrographic Data". IHO Special Publication S-57. Latest edition.

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# PART III

## SUPPLEMENTARY FEATURES

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## 1. INTRODUCTION

Part 3 of the IHO ECDIS Presentation Library carries supplementary features intended to aid the manufacturer in implementing the IHO Colour & Symbol Specifications (C&SS), and the mariner in using them. It consists of:

- software to convert CIE to RGB colour coordinates, following colour calibration of the monitor to be used for the ECDIS display,

- mariners' ECDIS Chart 1, to help familiarise the mariner with the colour and symbol coding used by ECDIS and to aid in picking the appropriate symbol for manual chart correction.

- colour differentiation test diagrams to enable the mariner to test whether his screen is still capable of differentiating the main colours used in ECDIS, and also to assist him in setting the brightness and contrast controls.

As with Part 1 of the Presentation Library, these features implement the IHO "Colour and Symbol Specifications: (C&SS)", which in turn are Appendix 2 to IHO S-52 "Specifications for Chart Content and Display Aspects of ECDIS"

## 2. SOFTWARE TO CONVERT CIE COLOUR COORDINATES TO RGB VALUES FOR A SPECIFIC MONITOR

### 2.1 Introduction

This software is intended for processing:

(a) the initial CIE to RGB calibration described in section 4.1.6 and Annex B section 1 of the C&SS, and

(b) the calibration verification described in section 5.2.3 and Annex B section 4 of the C&SS

The software is provided to avoid every user having to code the algorithms given in Annex B. Other equivalent software may be used if preferred.

### 2.2 CIE2RGB Calibration Routine

See section B 6.0 of Annex B to the C&SS.

### 2.3 CHECKXYL Calibration Verification Utility

See section B 6.1 of Annex B to the C&SS.

### 2.4 Software Files

The software files are to be found on the Presentation Library CD-Rom. See README file on CD-Rom for details.

### 2.5 "Get started" RGB tables

In addition to a DAY_BRIGHT colour table giving both CIE and RGB colour values which is included in Annex B section 6.0 of the C&SS, DAY_BLACKBACK and NIGHT tables, are given below to provide "get started" RGB values for initial display development. All these tables are for a particular Sony monitor.

The column headings are: colour token: colour: CIE x: CIE y: CIE L; R ;G ;B ; check number.

Note that because CRTs vary widely in their response to a given R, G, or B value, or even to given differences in R, G, and B values, these tables should not be used in an operational ECDIS. The ECDIS CRT should be calibrated as described in Annex B.

Table: DAY_BLACKBACK

| colour token; | colour; | CIE x; | CIE y; | CIE L; | R; | G; | B; | check number |
|---|---|---|---|---|---|---|---|---|
| NODTA; | grey; | 0.2800; | 0.3100; | 25.000; | 158; | 161; | 152; | 0.017760 |
| CURSR; | orange; | 0.5200; | 0.3900; | 28.000; | 253; | 122; | 62; | 0.414802 |
| CHBLK; | grey; | 0.2800; | 0.3100; | 45.000; | 197; | 203; | 192; | 0.208576 |
| CHGRD; | grey; | 0.2800; | 0.3100; | 45.000; | 197; | 203; | 192; | 0.208576 |
| CHGRF; | grey; | 0.2800; | 0.3100; | 25.000; | 158; | 161; | 152; | 0.017760 |
| CHRED; | red; | 0.4800; | 0.3000; | 25.000; | 255; | 81; | 119; | 5.885393 |
| CHGRN; | green; | 0.3000; | 0.5200; | 60.000; | 139; | 255; | 98; | 0.883585 |
| CHYLW; | yellow; | 0.4100; | 0.4700; | 70.000; | 255; | 240; | 82; | 7.237246 |
| CHMGD; | magenta; | 0.2800; | 0.2400; | 53.000; | 252; | 192; | 248; | 0.131075 |
| CHMGF; | magenta; | 0.3000; | 0.1700; | 20.000; | 226; | 66; | 204; | 0.624706 |
| CHBRN; | brown; | 0.4200; | 0.4500; | 25.000; | 189; | 155; | 67; | 0.298708 |
| CHWHT; | white; | 0.2800; | 0.3100; | 80.000; | 245; | 255; | 242; | 1.875027 |
| SCLBR; | orange; | 0.5200; | 0.3900; | 28.000; | 253; | 122; | 62; | 0.414802 |
| CHCOR; | orange; | 0.5200; | 0.3900; | 28.000; | 253; | 122; | 62; | 0.414802 |
| LITRD; | red; | 0.4800; | 0.3000; | 25.000; | 255; | 81; | 119; | 5.885393 |
| LITGN; | green; | 0.3000; | 0.5200; | 60.000; | 139; | 255; | 98; | 0.883585 |
| LITYW; | yellow; | 0.4100; | 0.4700; | 70.000; | 255; | 240; | 82; | 7.237246 |
| ISDNG; | magenta; | 0.2800; | 0.2400; | 53.000; | 252; | 192; | 248; | 0.131075 |
| DNGHL; | red; | 0.4800; | 0.3000; | 25.000; | 255; | 81; | 119; | 5.885393 |
| TRFCD; | magenta; | 0.2800; | 0.2400; | 53.000; | 252; | 192; | 248; | 0.131075 |
| TRFCF; | magenta; | 0.3000; | 0.1700; | 20.000; | 226; | 66; | 204; | 0.624706 |
| LANDA; | brown; | 0.3600; | 0.4000; | 20.000; | 162; | 145; | 96; | 0.258437 |
| LANDF; | brown; | 0.4500; | 0.4500; | 45.000; | 251; | 188; | 62; | 0.207184 |
| CSTLN; | grey; | 0.2800; | 0.3100; | 45.000; | 197; | 203; | 192; | 0.208576 |
| SNDG1; | grey; | 0.2800; | 0.3100; | 30.000; | 169; | 173; | 163; | 0.460241 |
| SNDG2; | white; | 0.2800; | 0.3100; | 80.000; | 245; | 255; | 242; | 1.875027 |
| DEPSC; | grey; | 0.2800; | 0.3100; | 45.000; | 197; | 203; | 192; | 0.208576 |
| DEPCN; | grey; | 0.2800; | 0.3100; | 25.000; | 158; | 161; | 152; | 0.017760 |
| DEPDW; | black; | 0.2800; | 0.3100; | 0.000; | 0; | 0; | 0; | 0.000000 |
| DEPMD; | dark_blue; | 0.2700; | 0.3000; | 2.000; | 64; | 64; | 64; | 0.295144 |
| DEPMS; | medium_blue; | 0.2400; | 0.2600; | 8.000; | 95; | 104; | 116; | 0.506959 |
| DEPVS; | light_blue; | 0.2200; | 0.2400; | 14.000; | 105; | 130; | 153; | 0.399280 |
| DEPIT; | yellow-green; | 0.2600; | 0.3600; | 14.000; | 97; | 137; | 110; | 0.559591 |
| RADHI; | green; | 0.3000; | 0.5200; | 60.000; | 139; | 255; | 98; | 0.883585 |
| RADLO; | green; | 0.3000; | 0.5200; | 20.000; | 93; | 164; | 67; | 0.158009 |
| ARPAT; | green; | 0.3000; | 0.5200; | 60.000; | 139; | 255; | 98; | 0.883585 |
| NINFO; | orange; | 0.5200; | 0.3900; | 28.000; | 253; | 122; | 62; | 0.414802 |
| RESBL; | blue; | 0.1800; | 0.1500; | 28.000; | 131; | 157; | 255; | 13.212303 |
| ADINF; | yellow; | 0.4100; | 0.4700; | 35.000; | 204; | 182; | 65; | 0.223876 |
| RESGR; | grey; | 0.2800; | 0.3100; | 25.000; | 158; | 161; | 152; | 0.017760 |
| SHIPS; | white; | 0.2800; | 0.3100; | 80.000; | 245; | 255; | 242; | 1.875027 |
| PSTRK; | white; | 0.2800; | 0.3100; | 80.000; | 245; | 255; | 242; | 1.875027 |
| SYTRK; | grey; | 0.2800; | 0.3100; | 30.000; | 169; | 173; | 163; | 0.460241 |
| PLRTE; | red; | 0.5800; | 0.3500; | 18.000; | 242; | 54; | 48; | 0.189347 |
| APLRT; | orange; | 0.5200; | 0.3900; | 28.000; | 253; | 122; | 62; | 0.414802 |
| UINFD; | white; | 0.2800; | 0.3100; | 80.000; | 245; | 255; | 242; | 1.875027 |
| UINFF; | grey; | 0.2800; | 0.3100; | 30.000; | 169; | 173; | 163; | 0.460241 |
| UIBCK; | black; | 0.2800; | 0.3100; | 0.000; | 0; | 0; | 0; | 0.000000 |
| UIAFD; | light_blue; | 0.2200; | 0.2400; | 14.000; | 105; | 130; | 153; | 0.399280 |
| UINFR; | red; | 0.4800; | 0.3000; | 25.000; | 255; | 81; | 119; | 5.885393 |
| UINFG; | green; | 0.3000; | 0.5200; | 60.000; | 139; | 255; | 98; | 0.883585 |
| UINFO; | orange; | 0.5200; | 0.3900; | 28.000; | 253; | 122; | 62; | 0.414802 |
| UINFB; | blue; | 0.1800; | 0.1500; | 28.000; | 131; | 157; | 255; | 13.212303 |
| UINFM; | magenta; | 0.3000; | 0.1700; | 20.000; | 226; | 66; | 204; | 0.624706 |
| UIBDR; | grey; | 0.2800; | 0.3100; | 45.000; | 197; | 203; | 192; | 0.208576 |
| UIAFF; | brown; | 0.3600; | 0.4000; | 20.000; | 162; | 145; | 96; | 0.258437 |
| OUTLW; | black; | 0.2800; | 0.3100; | 0.000; | 0; | 0; | 0; | 0.000000 |
| OUTLL; | brown; | 0.3600; | 0.4000; | 20.000; | 162; | 145; | 96; | 0.258437 |
| RES01; | grey; | 0.2800; | 0.3100; | 25.000; | 158; | 161; | 152; | 0.017760 |
| RES02; | grey; | 0.2800; | 0.3100; | 25.000; | 158; | 161; | 152; | 0.017760 |
| RES03; | grey; | 0.2800; | 0.3100; | 25.000; | 158; | 161; | 152; | 0.017760 |
| RES04; | grey; | 0.2800; | 0.3100; | 25.000; | 158; | 161; | 152; | 0.017760 |
| RES05; | grey; | 0.2800; | 0.3100; | 25.000; | 158; | 161; | 152; | 0.017760 |

Table: NIGHT

| colour token; | colour; | CIE x; | CIE y; | CIE L; | R; | G; | B; | check number |
|---|---|---|---|---|---|---|---|---|
| NODTA; | black; | 0.2800; | 0.3100; | 0.000; | 0; | 0; | 0; | 0.000000 |
| CURSR; | orange; | 0.5200; | 0.3900; | 1.200; | 80; | 42; | 26; | 0.403304 |
| CHBLK; | grey; | 0.2800; | 0.3100; | 1.200; | 56; | 55; | 50; | 0.292258 |
| CHGRD; | grey; | 0.2800; | 0.3100; | 1.200; | 56; | 55; | 50; | 0.292258 |
| CHGRF; | grey; | 0.2800; | 0.3100; | 0.300; | 38; | 36; | 36; | 0.115190 |
| CHRED; | red; | 0.5800; | 0.3500; | 1.000; | 83; | 24; | 25; | 0.320974 |
| CHGRN; | green; | 0.3400; | 0.5400; | 1.000; | 45; | 55; | 18; | 0.238316 |
| CHYLW; | yellow; | 0.4300; | 0.4600; | 1.200; | 65; | 53; | 25; | 0.251662 |
| CHMGD; | magenta; | 0.3000; | 0.1700; | 1.100; | 79; | 28; | 70; | 0.281453 |
| CHMGF; | magenta; | 0.3000; | 0.1700; | 1.100; | 79; | 28; | 70; | 0.281453 |
| CHBRN; | brown; | 0.4200; | 0.4500; | 0.150; | 26; | 22; | 24; | 0.025868 |
| CHWHT; | white; | 0.2800; | 0.3100; | 1.740; | 63; | 61; | 60; | 0.393513 |
| SCLBR; | orange; | 0.5200; | 0.3900; | 1.200; | 80; | 42; | 26; | 0.403304 |
| CHCOR; | orange; | 0.5200; | 0.3900; | 1.200; | 80; | 42; | 26; | 0.403304 |
| LITRD; | red; | 0.5800; | 0.3500; | 1.000; | 83; | 24; | 25; | 0.320974 |
| LITGN; | green; | 0.3400; | 0.5400; | 1.000; | 45; | 55; | 18; | 0.238316 |
| LITYW; | yellow; | 0.4300; | 0.4600; | 1.200; | 65; | 53; | 25; | 0.251662 |
| ISDNG; | magenta; | 0.3000; | 0.1700; | 1.100; | 79; | 28; | 70; | 0.281453 |
| DNGHL; | red; | 0.5800; | 0.3500; | 1.000; | 83; | 24; | 25; | 0.320974 |
| TRFCD; | magenta; | 0.3000; | 0.1700; | 1.400; | 85; | 30; | 76; | 0.263089 |
| TRFCF; | magenta; | 0.3000; | 0.1700; | 1.100; | 79; | 28; | 70; | 0.281453 |
| LANDA; | brown; | 0.3600; | 0.3600; | 0.100; | 33; | 26; | 24; | 0.095019 |
| LANDF; | brown; | 0.4500; | 0.4500; | 0.300; | 41; | 36; | 12; | 0.068861 |
| CSTLN; | white; | 0.2800; | 0.3100; | 1.740; | 63; | 61; | 60; | 0.393513 |
| SNDG1; | grey; | 0.2800; | 0.3100; | 1.200; | 56; | 55; | 50; | 0.292258 |
| SNDG2; | white; | 0.2800; | 0.3100; | 2.460; | 70; | 69; | 67; | 0.226816 |
| DEPSC; | white; | 0.2800; | 0.3100; | 1.740; | 63; | 61; | 60; | 0.393513 |
| DEPCN; | grey; | 0.2800; | 0.3100; | 1.200; | 56; | 55; | 50; | 0.292258 |
| DEPDW; | black; | 0.2800; | 0.3100; | 0.000; | 0; | 0; | 0; | 0.000000 |
| DEPMD; | black; | 0.2800; | 0.3100; | 0.000; | 0; | 0; | 0; | 0.000000 |
| DEPMS; | dark-blue; | 0.1600; | 0.0800; | 0.040; | 24; | 12; | 37; | 0.038038 |
| DEPVS; | dark-blue; | 0.1600; | 0.0800; | 0.040; | 24; | 12; | 37; | 0.038038 |
| DEPIT; | yellow-green; | 0.2800; | 0.3600; | 0.010; | 18; | 22; | 24; | 0.019559 |
| RADHI; | green; | 0.3400; | 0.5400; | 1.000; | 45; | 55; | 18; | 0.238316 |
| RADLO; | green; | 0.3400; | 0.5400; | 0.200; | 30; | 34; | 10; | 0.107295 |
| ARPAT; | green; | 0.3400; | 0.5400; | 1.000; | 45; | 55; | 18; | 0.238316 |
| NINFO; | orange; | 0.5200; | 0.3900; | 1.200; | 80; | 42; | 26; | 0.403304 |
| RESBL; | blue; | 0.1800; | 0.1300; | 1.200; | 52; | 48; | 87; | 0.197626 |
| ADINF; | yellow; | 0.4300; | 0.4600; | 1.200; | 65; | 53; | 25; | 0.251662 |
| RESGR; | grey; | 0.2800; | 0.3100; | 0.300; | 38; | 36; | 36; | 0.115190 |
| SHIPS; | white; | 0.2800; | 0.3100; | 1.740; | 63; | 61; | 60; | 0.393513 |
| PSTRK; | white; | 0.2800; | 0.3100; | 1.740; | 63; | 61; | 60; | 0.393513 |
| SYTRK; | grey; | 0.2800; | 0.3100; | 1.200; | 56; | 55; | 50; | 0.292258 |
| PLRTE; | red; | 0.5800; | 0.3500; | 1.300; | 91; | 25; | 26; | 0.283729 |
| APLRT; | orange; | 0.5200; | 0.3900; | 1.200; | 80; | 42; | 26; | 0.403304 |
| UINFD; | grey; | 0.2800; | 0.3100; | 2.460; | 70; | 69; | 67; | 0.226816 |
| UINFF; | white; | 0.2800; | 0.3100; | 1.200; | 56; | 55; | 50; | 0.292258 |
| UIBCK; | black; | 0.2800; | 0.3100; | 0.000; | 0; | 0; | 0; | 0.000000 |
| UIAFD; | dark-blue; | 0.1600; | 0.0800; | 0.040; | 24; | 12; | 37; | 0.038038 |
| UINFR; | red; | 0.5800; | 0.3500; | 1.000; | 83; | 24; | 25; | 0.320974 |
| UINFG; | green; | 0.3400; | 0.5400; | 1.000; | 45; | 55; | 18; | 0.238316 |
| UINFO; | orange; | 0.5200; | 0.3900; | 1.200; | 80; | 42; | 26; | 0.403304 |
| UINFB; | blue; | 0.1800; | 0.1300; | 1.200; | 52; | 48; | 87; | 0.197626 |
| UINFM; | magenta; | 0.3000; | 0.1700; | 1.100; | 79; | 28; | 70; | 0.281453 |
| UIBDR; | grey; | 0.2800; | 0.3100; | 1.200; | 56; | 55; | 50; | 0.292258 |
| UIAFF; | brown; | 0.3600; | 0.3600; | 0.100; | 33; | 26; | 24; | 0.095019 |
| OUTLW; | black; | 0.2800; | 0.3100; | 0.000; | 0; | 0; | 0; | 0.000000 |
| OUTLL; | brown; | 0.3600; | 0.3600; | 0.100; | 33; | 26; | 24; | 0.095019 |
| RES01; | black; | 0.2800; | 0.3100; | 0.000; | 0; | 0; | 0; | 0.000000 |
| RES02; | black; | 0.2800; | 0.3100; | 0.000; | 0; | 0; | 0; | 0.000000 |
| RES03; | black; | 0.2800; | 0.3100; | 0.000; | 0; | 0; | 0; | 0.000000 |
| RES04; | black; | 0.2800; | 0.3100; | 0.000; | 0; | 0; | 0; | 0.000000 |
| RES05; | black; | 0.2800; | 0.3100; | 0.000; | 0; | 0; | 0; | 0.000000 |

# 3. ECDIS CHART 1

## 3.1 Introduction

The C&SS section 3.1.4 requires an ECDIS chart 1.

This series of chartlets is intended to familiarise the mariner with the colour and symbol coding used for ECDIS.

The chartlets are organized in the sequence of INT 1 for the paper chart, with which the mariner should be familiar. Since the same organization is used for the optional Viewing Groups of the Presentation Library manual, this ECDIS chart 1 may also be used to explain the Viewing Groups.

It is left to the manufacturer to present the ECDIS chart 1 to the mariner in the manner that best suits his ECDIS software.

## 3.2 Chartlets

The chartlets are included on the distribution CD-Rom as S-57 ed. 3 files. With these files is a set of special look-up tables to be used when symbolizing the chartlets. The chartlets are to be drawn using an ECDIS display generator with these look-up tables. Each chartlet is meant to fill a display screen with symbolized examples. See README file on the distribution CD-Rom for details.

## 3.3 Symbol explanations

The 8-digit symbol names used by the Presentation Library will, of course, be meaningless to the mariner. A plain language explanation of each symbol is included in the symbol exposition field of each symbol module in the digital version of the Presentation Library, and is extracted as a printout immediately following the Chart 1 chartlets in the hard-copy version.

The manufacturer should make these explanations available to the mariner, for example by cursor picking on the symbol in the Chart 1 display.

# 4. COLOUR TEST DIAGRAMS

## 4.1 Colour differentiation diagrams

### 4.1.1 (Details of the above)

An S-57 format file containing the Colour Differentiation Test Diagram is included on the Presentation Library distribution CD-Rom. A special set of look-up tables provides the necessary instructions to symbolize this file, which should be drawn so that the extent of the imaginary chart data covers the entire ECDIS display.

This diagram is provided primarily for the mariner's use, so that he can verify that his CRT still has the capability of differentiating important colours clearly. He can also re-set the brightness and contrast controls for night viewing as follows:

*On the darkened bridge, preferably with filter fitted, select the night colour differentiation diagram.*

*Turn both controls down to the minimum.*

*Turn the brightness control up until the black squares can be seen.*

*Turn brightness down until the black squares just disappear (the brightness control should then be at the detent position if the CRT is in the condition it left the manufacturer).*

*Finally adjust the contrast control to the level required for clear viewing.*

*Re-adjust the contrast as necessary for other colour tables and viewing conditions.*

The diagram is also intended for use by the type-approval authority in verifying all but the Day_Bright colour tables.

### 4.1.2 (Details of the above)

The diagram consists of twenty squares extending over the whole of a 350x270 mm (approx) screen. Each square is coloured with one of the four main background area shades (such as shallow water blue, DEPVS), and each carries a three-pixel wide diagonal line in one of the important line or symbol foreground colours (such as planned route red, PLRTE). These are arranged as follows:

Four main background colours:
DEPVS (shallow water blue) squares 3, 5, 11, 15, 18, 20.
DEPDW (deep water, white or black) squares 1, 7, 8, 10, 13, 19.
LANDA (land colour) squares 6, 14, 17.
NODTA (no data shade: radar, navigation safety lines and chartwork should be visible on the no-data part of a display) squares 2, 4, 9, 12, 16.

Six important foreground colours:
DEPSC (safety contour grey) squares 3, 10, 17.
NINFO (orange, mariner's information) squares 5, 8, 14, 16.
ADINF (yellow, manufacturer's information) squares 12, 15, 19.
TRFCD (magenta, traffic lanes and area boundaries) squares 1, 9, 11.
RADLO (the lower luminance radar green) squares 4, 6, 13, 18.
RESBL (blue, provisionally reserved for traffic info from transponder, VTS etc.) squares 2, 7, 20.

The test consists of being able to distinguish the background colours and to pick out the like foreground colours, ie to say that squares 3, 5, 11, 15, 18 and 20 all have a shallow water blue background, and that squares 3, 10 and 17 have a grey line.

Note that to overcome the tendency to remember the "correct" result, the sequence and colour combinations should, ideally, be changed each time the test is carried out.

Grey Scale

The grey scale is for use by technicians to detect differential gun ageing from the colour fringes that will be seen if this occurs.

It can also be used as a more sensitive method of setting the brightness control, in order to avoid losing information at night. The control should be set so that the black strip is just visible.

Eight grey strips are recommended, spaced logarithmically between the minimum and the maximum luminance for each of the five mandatory colour tables. A thin strip of background colour between each strip will avoid the appearance of ridging at strip junctions.

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