Paper for Consideration by TSMAD/ DIPWG

Improvement of Symbolization for RESARE and LNDMRK Feature Objects

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| *Submitted by:* | Jeppesen |
| *Executive Summary:* | Recommendation to improve symbolization for Restricted Area with Entry Restrictions and Landmark, Radio Tower. |
| *Related Documents:* | S-52 |
| *Related Projects:* | |

In PAPER BASED DESCRIPTION OF SYMBOLS and in clause 15 of PL for presentation of RESARE objects with entry restriction and LNDMRK object with attributes FUNCTN ='31' (radio), CATLMK='17' (tower) already exist more suitable Symbol and Line instructions, which to the point looks very much like to INT 1 presentation. But they are not used in current version Edition 3.4 of IHO presentation library (look-up table and Conditional Symbolization Procedures)

**Suggestions:**
To improve presentation of mentioned above objects it is necessary to revise entries of Look-up Tables for Point geometry type for LNDMRK object and to revise Conditional symbolization Procedure RESARE03, Continuation A.
See details in:
1. Presentation of LNDMRK feature object – See Review of Presentation of LNDMRK Object
2. Presentation of Restricted area with entry restrictions – See Review of Conditional Symbology Procedure (CSP) DEPVAL03

**Reducing symbolization of unnecessary ISODGR symbols for OBSTRN and UWTROC objects**.

To reduce presentation of unnecessary Isolated Danger Symbols for WRECKS objects CSP DEPVAL01 had been changed in edition 3.3 of IHO Presentation library in 2004. The result is a paradoxical situation: clutter from unnecessary ISODGR symbols has been reduced for WRECKS objects, but it has been increased for OBSTRN and UWTROC objects independently of surrounding depth area.
For a detailed description of the problem, its history and suggestions – See Review of Conditional Symbology Procedure (CSP) DEPVAL02

# Review of Presentation of LNDMRK Object

1. According to the current Look-up tables LNDMRK object with attributes FUNCTN ='31' (radio), CATLMK='17' (tower) should be presented with TOWERS01 (TOWERS03) symbols' instructions. But in PAPER BASED DESCRIPTION OF SYMBOLS and in clause 15 of PL there are more suitable symbols for such instance of LNDMRK.
They are:
SY(TOWERS05) - radio, television tower (410) and SY(TOWERS15) - Conspicuous radio, television tower (412).
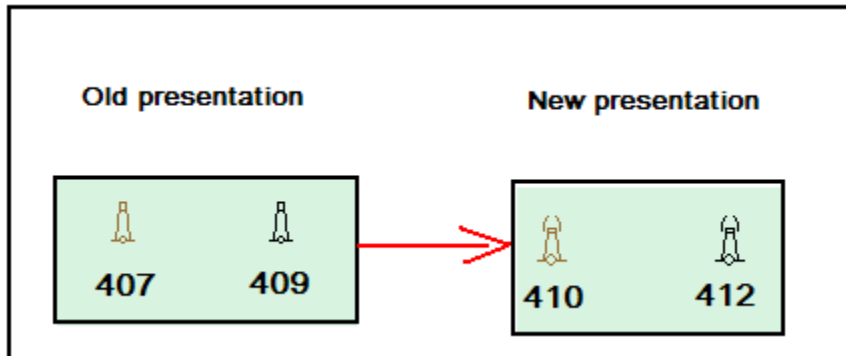
## Suggestions

I. To add (may be to the DEFERRED AMENDMENT 8 (Number 7 – May 2009)) the following entries to improve presentation of such object's instance:

**Look-up Table for paper chart point symbolization**

…………………………………………
"LNDMRK","","SY(POSGEN01)","4","O","OTHER","32220"
"LNDMRK","CATLMK17FUNCTN33CONVIS1","SY(TOWERS03);TX(OBJNAM,3,2,2,'15110',1,-1,CHBLK,26)","6","O","STANDARD","22220"
***"LNDMRK","CATLMK17FUNCTN33CONVIS1","SY(TOWERS15);TX(OBJNAM,3,2,2,'15110',1,-1,CHBLK,26)","6","O","STANDARD","22220"***
"LNDMRK","CATLMK17FUNCTN33CONVIS1","SY(TOWERS03);TX(OBJNAM,3,2,2,'15110',1,-
"LNDMRK","CATLMK15FUNCTN20CONVIS1","SY(BUIREL13)","6","O","STANDARD","22220"
………………………………………
"LNDMRK","CATLMK17FUNCTN33","SY(TOWERS01);TX(OBJNAM,3,2,2,'15110',1,-1,CHBLK,26)","4","O","OTHER","32220"
***"LNDMRK","CATLMK17FUNCTN31","SY(TOWERS05);TX(OBJNAM,3,2,2,'15110',1,-1,CHBLK,26)","4","O","OTHER","32220"***
………………………………………………………………

**Look-up Table for simplified point symbolisation**

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"LNDMRK","","SY(POSGEN01)","4","O","OTHER","32220"
"LNDMRK","CATLMK17FUNCTN33CONVIS1","SY(TOWERS03);TX(OBJNAM,3,2,2,'15110',1,-1,CHBLK,26)","6","O","STANDARD","22220"
***"LNDMRK","CATLMK17FUNCTN33CONVIS1","SY(TOWERS15);TX(OBJNAM,3,2,2,'15110',1,-1,CHBLK,26)","6","O","STANDARD","22220"***
"LNDMRK","CATLMK17FUNCTN33CONVIS1","SY(TOWERS03);TX(OBJNAM,3,2,2,'15110',1,-
"LNDMRK","CATLMK15FUNCTN20CONVIS1","SY(BUIREL13)","6","O","STANDARD","22220"
………………………………………
"LNDMRK","CATLMK17FUNCTN33","SY(TOWERS01);TX(OBJNAM,3,2,2,'15110',1,-1,CHBLK,26)","4","O","OTHER","32220"
***"LNDMRK","CATLMK17FUNCTN31","SY(TOWERS05);TX(OBJNAM,3,2,2,'15110',1,-1,CHBLK,26)","4","O","OTHER","32220"***
………………………………………………………………

**Review of Conditional Symbology Procedure (CSP) DEPVAL03**
**Presentation of Restricted Area with Entry Restrictions**

According to current Look-up tables and Conditional Symbology Procedure RESARE03 object instance of RESARE with attribute RESRTN = '7' (Entry prohibited), RESRTN = '8' (Entry restricted) and RESRTN = '14' (Area to be avoided prohibited) for Areas with symbolized boundaries (CSP RESTRN03) should be drawn with LC(CTYARE51).
But in PAPER BASED DESCRIPTION OF SYMBOLS and in clause 15 of PL there is more suitable line style, which to the point looks very much like to INT 1 presentation. It is complex line style LC(ENTRES51) - boundary of an area where entry is prohibited or restricted.

Picture 1. Line styles for RESARE with restriction for Entry
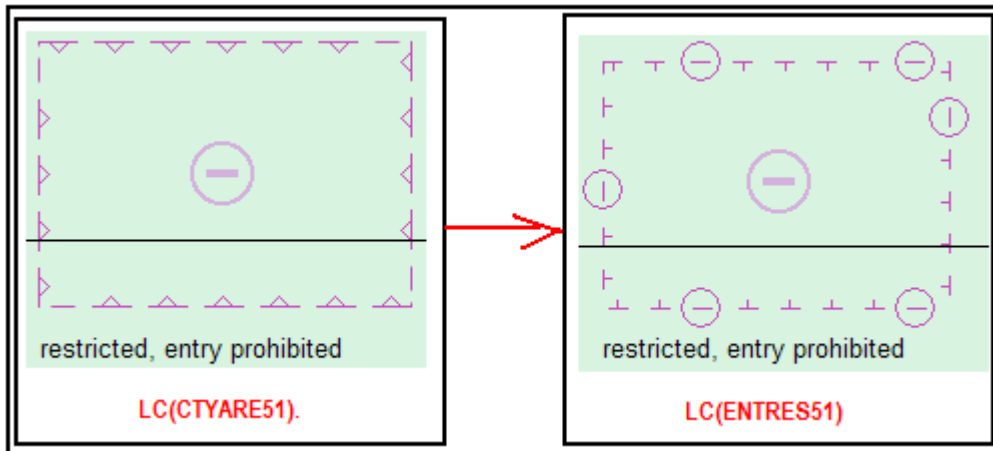
**Suggestions:**

To review CSP RESTRN03, Continuation A to use LC(ENTRES51) line style instead of LC(CTYARE51) – see picture below.

Picture 2. CSP RESARE03, Continuation A

In REGULATIONS OF THE IHO FOR INTERNATIONAL (INT) CHARTS AND CHART SPECIFICATIONS OF THE IHO (S4) for Chart Specifications of the IHO Medium and Large-scale Charts (B-420 DANGERS: GENERAL, DANGER LINE) the following rule is specified:

*.....The fullest possible information on clearance depths shall be given irrespective of their depths, in preference to making any arbitrary distinction between 'dangerous' and 'non-dangerous' depths. This will allow navigators of all classes of vessels, including deep-draught ships and submerged submarines, to make their own assessments of what is dangerous to them.*

In S-57 attribute EXPSOU=2 can be used to indicate objects with a value of sounding not within the range of depth of the surrounding depth area. These objects could be a potential danger for navigation.

An attempt to take into account Safe Clearance Depth was done in IHO Presentation library (Edition 3.3, March 2004). CSPs DEPVAL, WRECKS and OBSTRN have been modified to use the local DRVAL1 for default 'least depth' where EXPSOU indicates that no shoaler depths exist. It was assumed as the fail safe case, that a point or area wreck or obstruction and UWTROC whose VALSOU and EXPSOU are unknown will be shoaler than the DRVAL1 of the surrounding depth area.

Specifically, an additional branch was added to CSP DEPVAL01 (now DEPVAL02 – see picture 1, red rectangle):

**Picture 1**
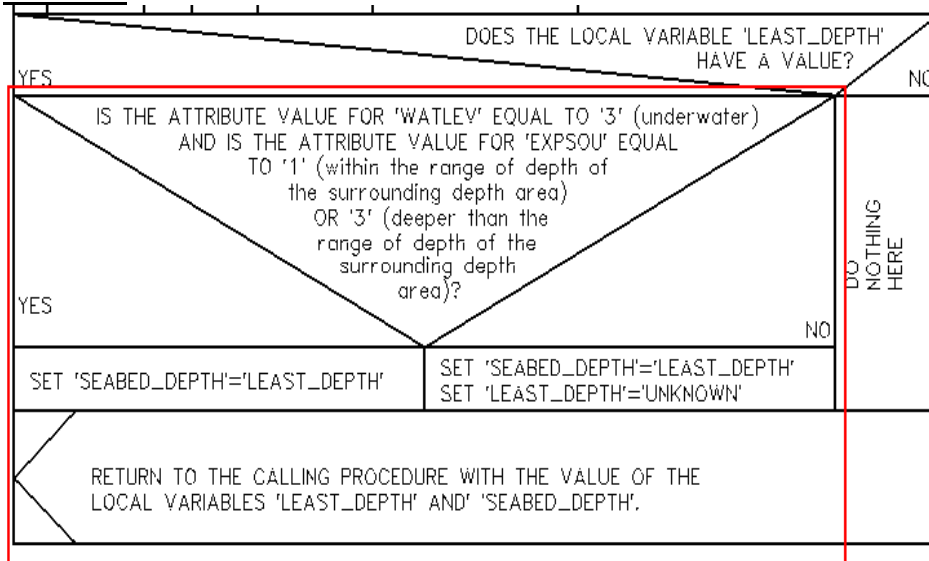


This change was made in the hope that (see C&S MAINTENANCE DOCUMENT Number 4 – March 2004 DEFERRED AMENDMENT 6):

*TSMAD WG should be asked:*
*1.) To clarify the UOC 5.4.3 definition of DRVAL1 by stating that isolated wrecks, rocks and obstructions within a particular DEPARE may have less depth than the DRVAL1 of that DEPARE.*
*2.) To encourage the coding of EXPSOU=1 'within the range of depth of the surrounding depth area' on wrecks, rocks and obstructions wherever sufficient information is available to do so, and*

*To encourage the coding of EXPSOU=2 'not within the range of depth of the surrounding depth area' wherever the information available is insufficient,*
*- In order to provide the best possible information available on the least depth over such hazards and thus eliminate clutter from unnecessary ISODGR symbols on the ECDIS display.*

Unfortunately, the current situation is different - based upon an analysis of current ENC from a number of different hydrographic offices, it was found that hydrographic offices for various reasons try to avoid using the EXPSOU attribute for hazards (especially for OBSTRN and UWTROC) where the value should to be set to '1' (within the range of depth of the surrounding depth area) or '3' (deeper than the range of depth of the surrounding depth area). This results in (see picture 1) that the  local variable 'LEAST_DEPTH' for hazards with WATLEV equal '3' (always under water) and without EXPSOU attribute set or with unknown value of EXPSOU will always be set to 'UNKNOWN'.
Second new local variable 'SEABED_DEPTH' will then be set to the least DRVAL1 of DEPAREs that intersect with the processed object. This new local variable ('SEABED_DEPTH') was suggested to be used for simplified calculation of Safe Clearance Depth of WRECKS (suggestion of Mr. Le Bihan).
It should be underlined that 'SEABED_DEPTH' local variable is used only in CSP WRECKS04, but not for CSP OBSTRN06, which is used for presentation of OBSTRN and UWTROC objects. In cases where old local variable 'LEAST_DEPTH' is 'UNKNOWN' (and this will be always be the case where EXPSOU attribute is missing or 'UNKNOWN) fail-safe depth for OBSTRN and UWTROC should be set according to the values of CATOBS and WATLEV attributes of correspondent object. Such fail-safe depth is always less that 0.01m. Thus (unless there is the unlikely situation where a mariner has set own safety contour to 0m or negative value) isolated danger symbol will be presented practically for all such objects.

The result is a paradoxical situation: clutter from unnecessary ISODGR symbols has been reduced for WRECKS objects, but it has been increased for OBSTRN and UWTROC objects independently of surrounding depth area.

## Suggestions:
As was mentioned above value of local variable SEABED_DEPTH CSP DEPVAL02 is not used further in CSP OBSTRN06 (for OBSTRN and UWTROC objects).
To reduce presentation of unnecessary Isolated Danger Symbols for OBSTRN and UWTROC objects it is necessary to revise CSP for detecting least depth (DEPVAL02). There may be two decisions of this problem:

1. To check the code of object and in case if it is **NOT** WRECKS to check the value of EXPSOU. If it is missing or unknown AND if the value of WATLEV = '3' then return to the calling procedure with the value of LEAST_DEPTH calculated in the loop for underlying group 1 objects.

2. To take into account the value of 'LEAST_DEPTH' calculated in the loop for group 1 object. In case if the calling object is **NOT** type of WRECKS AND if 'LEAST_DEPTH' is greater or equal to 30m then return to the calling procedure with the value of LEAST_DEPTH.
Two variants are shown at the picture 2.

# Picture 2



**DEPVAL02**

Conditional symbology procedure to establish a more precise value for the depth value of OBSTRN or WRECKS or UWTROC 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 is expecting the calling procedure to pass the attributes WATLEV and EXPSOU.

The procedure returns local variables 'LEAST_DEPTH' and 'SEABED_DEPTH'.

GET THE OBJECT WHICH IS CALLING THIS PROCEDURE

SET THE LOCAL VARIABLE 'LEAST_DEPTH' TO UNKNOWN (FAIL SAFE )
SET THE LOCAL VARIABLE 'SEABED_DEPTH' TO UNKNOWN (FAIL SAFE )

FOR EACH UNDERLYING GROUP 1 OBJECT WHICH IS WHOLLY OR PARTIALLY COVERED BY THE CALLING OBJECT, PERFORM THIS LOOP TO ESTABLISH A DEFAULT VALUE FOR THE LOCAL VARIABLE 'LEAST_DEPTH'.

IS THE UNDERLYING GROUP 1 OBJECT OF THE CLASS 'UNSARE' (unsurveyed area) ?
— YES / NO — THEN IT IS OF THE CLASS 'DEPARE' OR 'DRGARE'

IS THE VALUE OF THE UNDERLYING OBJECT'S ATTRIBUTE 'DRVAL1' GIVEN ?
— NO / YES

GET THE VALUE OF THE ATTRIBUTE 'DRVAL1'

IS THE VALUE OF THE ATTRIBUTE 'DRVAL1' MISSING OR UNKNOWN ?
— YES / NO

IS THE VALUE OF THE LOCAL VARIABLE 'LEAST_DEPTH' EQUAL TO UNKNOWN ?
— YES / NO

IS THE VALUE OF THE LOCAL VARIABLE 'LEAST_DEPTH' LESS THAN THE VALUE OF 'DRVAL1' ?
— YES / NO

SET THE VALUE OF THE LOCAL VARIABLE 'LEAST_DEPTH' EQUAL TO 'DRVAL1'

DO NOTHING HERE

SET THE VALUE OF THE LOCAL VARIABLE 'LEAST_DEPTH' EQUAL TO 'DRVAL1'

SET THE LOCAL VARIABLE 'LEAST_DEPTH' TO UNKNOWN, EXIT LOOP.

DO NOTHING HERE

**1** — DOES THE LOCAL VARIABLE 'LEAST_DEPTH' HAVE A VALUE?
— YES / NO

ATTRIBUTE VALUE FOR 'WATLEV' EQUAL TO '3' (underwater) AND IS THE ATTRIBUTE VALUE FOR 'EXPSOU' EQUAL TO '1' (within the range of depth of the surrounding depth area) OR '3' (deeper than the range of depth of the surrounding depth area)?
— YES / NO

SET 'SEABED_DEPTH'='LEAST_DEPTH'

**2** — SET 'SEABED_DEPTH'='LEAST_DEPTH'
SET 'LEAST_DEPTH'='UNKNOWN'

DO NOTHING HERE

RETURN TO THE CALLING PROCEDURE WITH THE VALUE OF THE LOCAL VARIABLES 'LEAST_DEPTH' AND 'SEABED_DEPTH'.

**1**

IF CALLING OBJECT IS NOT OF TYPE WRECK AND
IF ATTRIBUTE VALUE FOR 'WATLEV' IS EQUALTO '3' AND
IF ATTRIBUTE OF EXPSOU IS 'UNKNOWN' (EMPTY)
RETURN TO THE CALLING PROCEDURE WITH THE VALUE OF
LOCAL VARIABLE 'LEAST_DEPTH'

**OR**

Replace 2 with the following:

IF
CALLING OBJECT IS NOT TYPE 'WRECK' AND
IF 'LEAST_DEPTH IS GREATER THAN OR EQUAL TO 30M
RETURN TO THE CALLING PROCEDURE WITH THE VALUE OF
LOCAL VARIABLE 'LEAST_DEPTH'
ELSE
SET 'SEABED_DEPTH'='LEAST_DEPTH'
SET 'LEAST_DEPTH' = 'UNKNOWN'