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Paper for Consideration by CSPWG

Physical and Safe Clearance Heights of Overhead Cables

Submitted by:	UNITED STATES
Executive Summary:	Some IHO Member States indicate a “safe vertical clearance” for overhead power cables on nautical charts. Other Member States indicate a “physical vertical clearance” for overhead power cables on their charts. As pointed out by Sweden, this distinction may not be clear to many mariners. This paper suggests some possible actions that might assist chart users in understanding the meaning of clearance symbols.
Related Documents:	INT1 (D20, D26, H20); Publication S-4 (B-380, B-380.1, B-382.1); UKHO Chart 5011, Edition 5; Paper CSPWG8-8.11A (Sweden).

Introduction / Background

The United States (NGA and NOAA) has recently completed a new edition of United States Chart No. 1, Symbols, Abbreviations and Terms. During the compilation of the new edition, a dialog was initiated between the two agencies and with the UKHO regarding the charting of overhead cable clearances. As pointed out in Sweden’s paper, CSPWG8-8.11, vertical clearance of an overhead cable and the safe vertical clearance are charted differently.

I.H.O. standards for charting overhead cables are listed in I.H.O. Publication S-4, at Section B-382. In B-382.1, S-4 states, “The vertical clearance shall be quoted for the distance between high water and the lowest part of the cable where it crosses a navigable channel.....”

S-4 also states, “When known, the authorized safe clearance (known in the UK as the safe vertical clearance), which is the physical clearance minus a safety margin, shall be stated on the chart in magenta.” Remember that, “when known” part. We’ll come back to that.

Analysis/Discussion

In Paper CSPWG8-08.11A, Sweden expressed doubt that chart users know the difference between an overhead power cable vertical clearance charted in magenta (safe vertical clearance) from an overhead power cable vertical clearance charted in black (physical vertical clearance with no adjustment for risk of an electrical discharge).

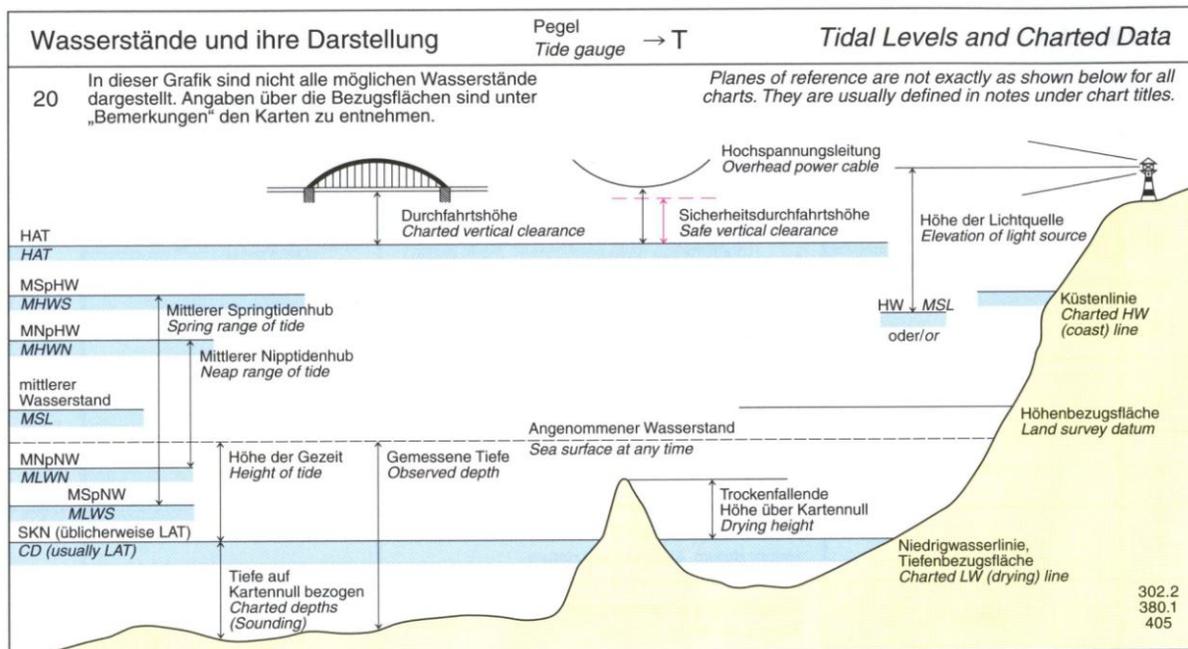
An Office of Coast Survey (NOAA) cartographer informally posed this question to a small sample of commercial mariners. The result: none knew the difference in meaning between the black physical vertical clearance symbol and the magenta safe vertical clearance symbol. This could present a dangerous situation for a chart user who mistakes a physical vertical clearance (in black) for a safe vertical clearance (in magenta).

Sweden opines, “it is confusing for the users to have two versions and therefore we proposed to have only one.”

This would present a problem for the United States and perhaps other nations. The responsible authority for overhead cable clearances in the United States is the U.S. Army Corps of Engineers (USACE). All overhead cables must be authorized by a permit from the USACE. USACE is required by federal law, to provide NOAA with an authorized minimum physical vertical clearance of any overhead cable at the lowest part of the cable where it crosses the waterway. A safe vertical clearance is not provided by the USACE and therefore the physical vertical clearance must be charted, because the safe vertical clearance is not known.

It is understandable that those hydrographic offices that have access to safe vertical clearance data and the authorization to chart those clearances would prefer to show a safe vertical clearance.

Karte 1 (INT 1), 7th Edition, 2011, produced by Germany, has a graphic showing the two types of vertical clearances at Symbol H 20.



A black representation of an overhead cable is shown with an unlabeled black vertical dimension line. A magenta dashed horizontal line is also shown below the cable to represent the maximum height of safe clearance. A magenta coloured vertical dimension line is shown with the label, “Safe vertical clearance”.

The United Kingdom Hydrographic Office (UKHO) Chart 5011, Symbols and Abbreviations Used on Admiralty Paper Charts, has a similar diagram as Karte 1 at Symbol H 20, but there are some minor differences that may help a chart user to distinguish the difference between a safe vertical clearance and a physical vertical clearance.

In Chart 5011, the label for the safe vertical clearance dimension line includes the word “Magenta” in parentheses.

In Chart 5011, the vertical dimension line for the physical vertical clearance of the overhead power cable is labeled, “Charted vertical clearance (Black).”

These additions might help a mariner understand the difference in the two types of clearances existing on nautical charts.

In addition, Chart 5011 includes an explanation of safe vertical clearance in the lower right corner of the graphic.

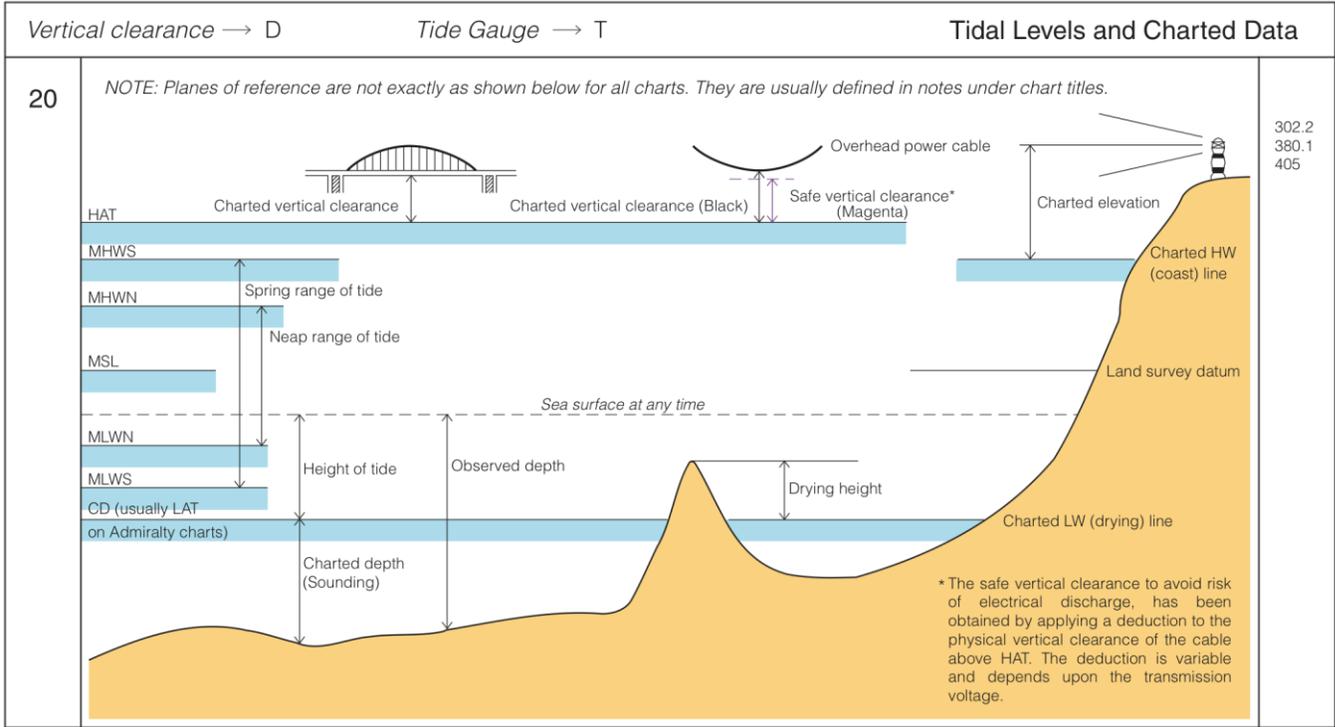
A similar explanation is found in Karte 1 as a footnote to Symbol D 26 (“Overhead power cable with pylons and safe vertical clearance”), but the United States believes that such a statement would also be helpful to chart users at H 20 as is done in Chart 5011. Note that the footnote for the vertical clearances of power cables at D 26 refers back to D 20, which shows **a bridge** symbol. This is potentially confusing.

The graphic used in UKHO Chart 5011, H 20, discussed above, is also found in Publication S-4, at Section B-302.2 and B-380.1 and B-405.

Perhaps it would also be helpful if the label for the safe vertical clearance vertical dimension line at H 20 could be changed to magenta coloured type.

Also, consider changing “Charted vertical clearance” at the overhead cable (and not the bridge), to “Physical vertical clearance (Black)”, since it may be the magenta safe vertical clearance that is actually charted.

See the next page for an image of Chart 5011, H 20.



Since there are two different types of overhead power cable clearances that may be charted, CSPWG might consider amending INT 1, Symbol D 26, into.....

D 26.1, showing the overhead power cable symbol and a physical vertical clearance symbol in black coloured type, with the term column stating, “Overhead power cable with pylons and physical vertical clearance (no safe clearance available)”

and.....

D 26.2, which would remain the same as the current D 26, with a safe vertical clearance. With the addition of D 26.1, the footnote for D 26.2 would not have to refer back to D 20, a generic vertical clearance symbol shown associated with a bridge.

The current Symbol D 26 from UKHO Chart 5011 is shown on the next page.

Plane of Reference for Heights → H		Other Cultural Features	
20		<p>Vertical clearance above Height Datum (in parentheses when displaced for clarity)</p>	<p>380.1 380.2</p>
21		<p>Horizontal clearance</p>	<p>380.3</p>
22		<p>Fixed bridge with vertical clearance</p>	<p>381.1</p>
23.1		<p>Opening bridge (in general) with vertical clearance</p>	<p>381.3</p>
23.2		<p>Swing bridge with vertical clearance</p>	
23.3		<p>Lifting bridge with vertical clearance (closed and open)</p>	
23.4		<p>Bascule bridge with vertical clearance</p>	
23.5		<p>Pontoon bridge</p>	
23.6		<p>Draw bridge with vertical clearance</p>	
24		<p>Transporter bridge with vertical clearance between Height Datum and lowest part of structure</p>	<p>381.2</p>
25		<p>Overhead transporter, Aerial cableway with vertical clearance</p>	<p>382.3</p>
26		<p>Overhead power cable with pylons and safe vertical clearance (see Note below D29)</p>	<p>382.1</p>
27		<p>Overhead cable, Telephone line, with vertical clearance</p>	<p>382 382.2</p>
28		<p>Overhead pipe with vertical clearance</p>	<p>383</p>
29		<p>Pipeline on land</p>	<p>377</p>

Note: The safe vertical clearance above Height Datum, as defined by the responsible authority, is given in magenta where known (see H20); otherwise the physical vertical clearance is shown in black as in D20.

Conclusions

It is highly probable that chart users do not understand the charted differences in the physical vertical clearance shown for some overhead power cables and the safe vertical clearance shown for other power cables.

Not all hydrographic offices have access to safe vertical clearance data and must use a physical clearance for overhead power cables.

Changes can be made to INT 1, national versions of INT 1, and the charts themselves to help the mariner understand the differences.

Recommendations

Changes to INT 1 and national versions of INT 1 addressed in Analysis/Discussion above should be made to help the chart user understand that two different types overhead power cable clearances ;may be charted.

Publication S-4, Section B-382.1 should suggest the option to chart a simple note such as:

OVERHEAD POWER CABLES

“Safe vertical clearances under power cables are shown in magenta. Physical vertical clearances are shown in black where the safe vertical clearance is unknown.

Justification and Impacts

It would be advantageous to better inform the chart user regarding the two different symbolizations.

The recommendations would require revisions to the three official IHO versions of INT 1, national versions of INT 1, and minor revision to Publication S-4, Section B-382.1

Action Required of CSPWG

Consider this paper

Determine the merit of the Recommendations, Justification and Impacts above.