

3rd NCWG MEETING
ESRI HQ, Redlands, California, USA 16-19 May 2017

Paper for Consideration by NCWG
Vertical Clearances on Bridges

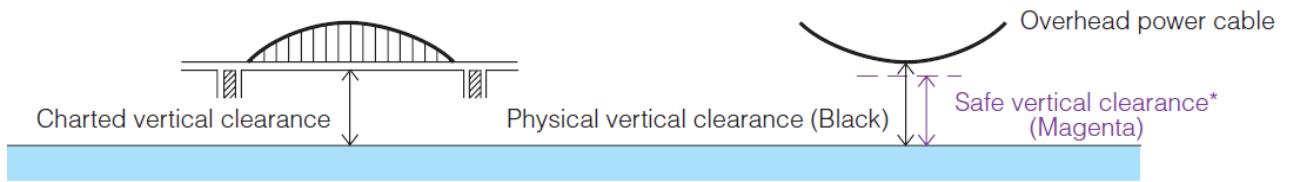
Submitted by:	Finland
Executive Summary:	If the vertical clearance for a bridge has been reduced by a safety margin, how should it be treated?
Related Documents:	S-4 B-380, S-57, S-101, S-32
Related Projects:	none

Introduction / Background

1. The S-4, as well as S-57 and draft S-101, recognises both vertical clearance and safe vertical clearance for overhead cables, but only vertical clearance for bridges. If the vertical clearance for a bridge has been reduced by a safety margin, how should it be treated?
2. The Finnish Transport Agency (FTA) has been reviewing its guidance on bridges that cross public waterways. The guidance includes, for example, instructions on dimensioning and marking the bridge clearances.
3. During the review process it was noted that inconsistencies exist between clearance markings on existing bridges and nautical charts. The cause for this inconsistency was identified to be related at least partly to terminology and translation of it.

Analysis / Discussion

4. According to the FTA bridge guidance, the markings on the bridge itself should show the vertical clearance reduced with a safety margin. The safety margin covers wave action and rolling of the vessel, and is normally between 0.5 and 1.0 metres, but at least 0.2 m. (Note: As there is no tide along the Finnish coast, the vertical/chart datum used is Mean Sea Level.)
5. IHO Specifications (S-4, S-57 and also S-101 draft) only recognise the actual vertical clearance for bridges. This had also been adopted in some charting guidance within the FTA.
6. Both the actual vertical clearance and the safe vertical clearance are to be delivered to FTA to be included into relevant registers, and normally received also in the Hydrographic Office. This together with inconsistencies in internal guidelines had sometimes led to cartographers populating different clearances into the chart database.
7. As a result the national charting guidelines have now been revised, and it has been made clearer that the value charted should always be the same that is shown on the signs at the bridge, that is, the reduced vertical clearance. There will be a note in Finnish Chart 1 to highlight this.
8. This practice, however, differs from the international specifications, where the vertical clearance for a bridge is considered to be the actual physical clearance.
9. In S-4 the vertical clearance for bridges is defined indirectly in B-380 and B-381. Together with the similar terminology on overhead cables (B-382), it is rather obvious that the charted vertical clearance for bridges should be the actual distance between the vertical datum and lowest possible part of the structure.



10. In S-57 bridges have the attribute VERCLR (Vertical clearance) and its counterparts VERCCL (Vertical clearance, closed) and VERCOP (Vertical, clearance, open) that are used on opening bridges. VERCLR is used not only for bridges, but also for overhead cables, conveyors, cranes, gates, overhead pipelines and tunnels. Its definition is: "The vertical clearance measured from the plane towards the object overhead." Overhead cables also have attribute VERCOSA (Vertical clearance, safe), which is defined simply as "The safe vertical clearance measured from the plane towards the object overhead".
11. In draft S-101 the attribute structure differs from S-57, but the definitions and usage are essentially the same.
12. The Hydrographic Dictionary defines 'vertical clearance' as "the minimum vertical space available for passage". It also has a definition for 'safe overhead clearance' and that is "the height above the vertical control datum at which the highest points of a ship can pass under an overhead power cable without risk of electrical discharge from the cable to the ship or without making contact with a bridge."
13. In the discussions at the Finnish Hydrographic Office, it was also considered if it would be feasible to propose extending the usage of the magenta 'safe vertical clearance' symbol and the 'Vertical clearance, safe' attribute in S-101 ENC to cover also bridges. This was seen possible, but not necessary.

Conclusions

14. The IHO chart standards only seem to recognise actual vertical clearance for bridges.
15. The IHO Hydrographic Dictionary includes 'safe overhead clearance' and that refers also to bridges.
16. The Finnish national practice is to show a safe vertical clearance on the signs at the bridge and on the charts. This differs from IHO Specifications, but is on the safer side.

Recommendations

17. NCWG to discuss the issue and decide whether the guidance on bridge clearances should be clarified.

Justification and Impacts

18. Clarified guidance will improve consistency.

Action required of NCWG

19. The NCWG is invited to:
 - a. discuss this paper and take appropriate action.