

10th CSPCWG MEETING
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Paper for Consideration by CSPCWG

Minimum Depth and Maximum Authorised Draught

Submitted by:	Australia
Executive Summary:	Discussions related to Paper CSPCWG9-08.14A and resultant actions have raised a more fundamental question regarding the use of colour for the depiction of minimum depth and maximum authorised draught on paper charts.
Related Documents:	S-4 Regulations of the IHO for International (INT) Charts and Chart Specifications of the IHO; INT1 Symbols, Abbreviations and Terms used on Charts; CSPCWG9-08.14A Maximum Draught Areas; CSPCWG Letter 07/2013 Actions from 9 th CSPCWG Meeting: Group 3 'Hydrography'; CSPCWG Letter 13/2013 Follow Up to Letter 07/2013.
Related Projects:	INT1 and S-4 Maintenance

Introduction / Background

Discussions at CSPCWG9 regarding Paper CSPCWG9-08.14A – Maximum Draught Areas (Italy), resulted in CSPCWG9 Action 36 - Secretary to draft new specification on maximum draught and minimum depth (and consider placement in S-4). CSPCWG Letter 07/2013 provided a draught amendment to S-4 – B-432.4 specifying a distinction between maximum authorized draught (e.g. <18.5m>), and minimum depth (e.g. 18.5). However a CSPCWG Secretary comment included in the Letter prompted Australia to consider the revised specification at a more fundamental level, principally in terms of the general use of colour on paper charts. The resultant Australian response to Letter 07/2013 prompted the CSPCWG Chair to raise this issue for further discussion at CSPCWG10 (see Chair comments in CSPCWG Letter 13/2013).

This Paper considers all the discussions and comments in regard to this issue so far, and recommends that CSPCWG consider amending S-4 and INT1 to portray depths associated with maximum authorised draught and minimum depth more consistently in accordance with the general use of colour specifications at S-4 – B-140.

Analysis / Discussion

A chronological summary of discussions is at Attachment 1 to this Paper.

The draft amended specification B-432.4 as included in CSPCWG Letter 07/2013 specifies the distinction between a depth indicating the maximum authorised draught and the minimum depth along a track or in a channel as the inclusion of the "<>" enclosing the depth (indicating that the depth is a maximum authorised draught). However, the CSPCWG Secretary has included the following comments in relation to the suggested symbology:

- At present, we use magenta for maximum draught in fairways (and by extension in other routing measures). However, we use black in recommended tracks (which is where the < > symbol derives from) and in fish havens. As a regulatory concept, perhaps we should be consistent and always show in magenta (and that would be consistent for recommended tracks with the treatment at M5 of other regulatory information combined with a black track). It would mean further changes at B-434.3 (and INT1 M6) and B-447.5 (M46.2). The latter (fish haven) is unlikely to affect many existing charts, but the former (tracks) would take a long time to change.

- At present, we use magenta for minimum depth in a DW route and Fairway (and by extension in other routing measures), but black in a dredged area. As minimum depth is a more physical concept than the maximum draught above, black is more logical (and would assist the differentiation between the two). However, it would mean changing B-434.5 (and INT1 M18) and B-435.3f (and M27.2). It may take a long time to change on charts and in the intervening period the black on recommended tracks could mean either maximum draught or minimum depth. (As maximum draught should be less than minimum depth, this may not matter).

It should be noted that previous CSPCWG discussions regarding the use of the “<>” symbols to indicate maximum authorised draught relate only to the INT – M6 symbol and description for a “Recommended track with maximum authorised draught stated”. In terms of the analysis and recommendations made in this Paper, it is considered that the intention of the “<>” at INT1 – M6 is associative only in that the “<>” is intended to mark the two-way nature of the track, and was never intended to be an indication of the depth stated as a maximum authorised draught. From this perspective, there is no relationship of this convention to any of the general conventions described in S-4 Section B-100. Additionally, there is no aspect of the “<>” which could be considered to be intuitive in terms of the mariner understanding the purpose of this symbol as implying “maximum authorised draught”. In fact, the mariner may be more likely to think of such symbology as serving a “directional” purpose, particularly as the only current representation of this symbol is in the “Tracks and Routes” section of INT1, or perhaps a horizontal clearance based on the direction of the arrow heads. CSPCWG has previously conceded that the “<>” symbol is not intuitive in terms of indicating maximum authorised draught, however it has also been conceded that adopting new symbols utilising “<>” and leaving existing symbols in INT1 unchanged would have minimum impact on existing published paper chart portfolios.

As described in the new draft specification B-432.4, the “convention” of the use of the “<>” symbol (in magenta) has exceptions in regard to the use of colour for recommended tracks and fish havens (for maximum authorised draught) and for dredged areas and channels (for minimum depth). It may be that the exceptions (e.g. for INT1 – M6) are a result of requirements for the colour separate offset printing process (i.e. to remove any registration issues with combining different colours in a single symbol).

S-4 Clause B-140 contains specification for the use of colour on paper charts. This includes, for the use of black

- For all physical (solid) features, including depth information (but see B-142.2(2) for submarine cables and pipelines and B-144 for some depth contours).

at B-141, and for the use of magenta

- Distinguishing information superimposed on the physical features and not implying any permanent physical obstruction (but see B-145 for the use of green for environmental information).

at B-142. If such fundamental conventions are to be used such that the information shown on paper charts is to be interpreted consistently by the mariner, any alternative conventions which result in exceptions to the conventions for the use of colour should be kept to a minimum. It is suggested that such alternate conventions should only be adopted where such exception to the convention for the use of colour results in a more intuitive representation to the mariner. This is not the case for the “<>” symbol.

In regard to the conventions for the use of colour at B-140, the distinction between the representation of depths indicating maximum authorised draught and minimum depth should be as follows:

- Any depth indicating a “physical” depth, including the minimum depth along tracks or in channels (such as routing measures, dredged areas and fairways) should be shown in black; and
- Any depth shown along a track or within a channel (including routing measures, dredged areas and fairways) indicating a maximum authorised draught that is shoaler than the physical minimum depth (i.e. is “superimposed on the physical feature and not implying any permanent physical obstruction”) should be in magenta.

The inclusion of any “<>” symbol should only be in association with another relevant intended use of the symbol, such as at INT1 – M6 to indicate a two-way recommended track. Further, in order to apply a more consistent interpretation of the conventions for the

use of colour at S-4 – B-140, and therefore provide scope for a more consistent interpretation of the use of black and magenta by the mariner, all existing INT1 symbology related the depiction of depth information should be reviewed and amended in accordance with the colour conventions above. In regard to S-4, as such convention is considered as a general specification, it is suggested that specification as to the use of colour for charted depth information should be included at B-410 (as a new clause B-410.2). A possible exception to the general convention may be where a maximum authorised draught is directly associated with an ESSA (i.e. the relevant regulations state a maximum authorised draught within the ESSA), which will need further consideration of CSPCWG.

It is conceded that the application of such changes to S-4 and INT1 would, in some cases, result in significant action to bring chart portfolios up to date with the revised specifications. However, as these changes would only apply to the colour of the information on the chart (and not the charted value), these could be actioned through the Revised Reprint process, and not applied by Notices to Mariners.

In summary:

- Fundamental conventions exist for the use of colour in S-4, which provide a clear distinction between the use of black (for physical features, including depth information) and magenta (for information superimposed on the physical feature and not implying any permanent physical obstruction). For this fundamental cartographic convention to be interpreted consistently by the mariner, any departure from these conventions should be kept to a minimum.
- The symbol “<>” has been suggested as a convention for indicating maximum authorised draught. However, this suggestion is based only on one existing INT1 symbol (M6) and has no relevance the general charting conventions in S-4 – B-100, and is not intuitive to the mariner.
- Adoption of the “<>” symbol as a general indication of maximum authorised draught would result in minimal impact on existing published paper chart portfolios, however it would initiate a further departure of the conventions for the use of colour at S-4 – B-140.
- In order to promote consistent application of the conventions in S-4, and have resultant consistent interpretation of these conventions by the mariner, CSPCWG should consider amending S-4 and INT1 such that all existing specifications/symbols relating to the representation of maximum authorised draught and minimum depth is consistent with the conventions for the use of colour at S-4 – B-140. CSPCWG should also consider any future specification/symbology similarly.

Recommendations

1. That CSPCWG consider adding a new clause at B-410.2 similar to:

B-410.2 Maximum draught and minimum depth

- a. In areas where the tidal range is not appreciable, it may be useful to state the **maximum draught** of vessels authorized by a regulatory authority to navigate a recommended track (see B-434.3), a fairway (see B-434.5b) or within any other regulated area. The maximum authorized draught must be charted in magenta, eg: **18.5m (I6)** where it differs from the actual physical depth. The size of the legend when depicted in an area is at the discretion of the cartographer, but it should stand out clearly from other detail in the area.

Note: The difference in value between the actual minimum depth and the authorized (or recommended) maximum draught will vary according to the situation (eg whether the sections of track are sheltered or not). This will be determined by the regulatory authority. Where the maximum authorized draught and the minimum depth of water at chart datum are the same value, the value should be charted as a minimum depth value (see below).

Blue shallow water tint must be applied to any area in accordance with the physical depths. Where the maximum authorized draught is strictly enforced, consideration may be given to removing all other depth information (ie soundings, depth contours and minimum depth values) from the area.

- b. All other depths quoted on tracks, in deep water routes and dredged areas or channels must indicate the **minimum depth** of water at chart datum (and a survey year date if not maintained), as determined by a port or hydrographic authority (see

also B-435.3f). The minimum depth of water at chart datum must be charted in black, eg: *18.5m (I5)*. No statements of minimum depths must be made in changeable areas unless the critical depths are regularly examined and updated.

Alternatively, the above may be replace the existing B-432.4.

2. That CSPCWG discuss the possibility of an exception to the general convention for a maximum authorised draught associated with ESSA (i.e. depiction of the value in green). Based on the outcome of this discussion, CSPCWG to determine any required amendment to S-4 and INT1.
3. If (1) above is agreed, that CSPCWG consider the following additional amendments to S-4:
 - a. B-142.2(3): Add a new bullet point at B-142.2(3) indicating that maximum authorised draught is to be indicated in magenta (do not consider that any qualification is required at B-141 second bullet as this refers to “physical (solid) features”, unless CSPCWG thinks there should be a reference to B-142.2(3)).
 - b. B-414: Amend clause and sub-clauses to include guidance and examples of dredged areas with maximum authorised draught in magenta.
 - c. B-432.4: Amend clause to refer to new clause B-410.2.
 - d. B-434.3: Amend clause to have the maximum authorised draught value quoted in magenta (<> symbols should remain in black), and add a new paragraph and symbol to have an example of a track having minimum depth quoted in black.
 - e. B-434.5: Amend clause to have minimum depth (example (a)) quoted in black, and remove magenta “<>” from example (b). Amend references to B-410.2b (for minimum depth) and B-410.2a (for maximum authorised draught).
 - f. B-435.3(f): Amend to have minimum depth quoted in black. CSPCWG discussion required as to whether guidance for maximum authorised draught is required in S-4.
 - g. B-447.5: Amend 3rd paragraph to refer to B-410.2. Amend 4th paragraph and example to have maximum authorised draught quoted in magenta.
4. If (1) above is agreed, that CSPCWG/INT1 Sub-Working Group consider the following amendments to INT1:
 - a. New symbol for minimum depth be added at I5.
 - b. New symbol for maximum authorised draught be added at I6.
 - c. Is there a requirement for a new symbol to be added for maximum authorised draught in dredged areas, possibly by separating I21 into I21.1 (minimum depth) and I21.2 (maximum authorised draught)?
 - d. Amend values at M6 to magenta (“<>” to remain in black).
 - e. Is there a requirement for a new symbol for recommended track with minimum depth at M7 (or possibly split M6 into M6.1 (maximum authorised draught) and M6.2 (minimum depth))?
 - f. Amend description at M18 to read “Fairway designated by regulatory authority with maximum authorised draught stated”.
 - g. Is there a requirement for a new symbol for fairway with minimum depth at M19 (or possibly split M18 into M18.1 (maximum authorised draught) and M18.2 (minimum depth))?
 - h. Amend value associated with M27.2 to black.
 - i. Is there a requirement for a new symbol for two-way deep water route with maximum authorised draught at M27.4?

Justification and Impacts

New specification that is in agreement with the general nautical cartography conventions, such as the conventions for the use of colour on paper charts, can only assist the mariner in better interpretation of these conventions when using navigational products. Adoption of new specifications based on reducing the impact on existing specifications and chart portfolios, without consideration of such conventions (and in some cases contradicting these conventions), may only serve to exacerbate an already existing problem, which may

in turn bring into question the requirement for such fundamental conventions in the specifications.

While the analysis and recommendations in this paper require significant changes to S-4 and INT1, and may require by extension significant changes to chart portfolios, it is considered that this will ultimately be of benefit to the mariner.

Action required of CSPCWG

CSPCWG is invited to:

- a. Consider this Paper; and
- b. Determine appropriate changes to INT1 and S-4 based on the recommendations above.

Attachments:

1. Chronological summary of discussions regarding depiction of maximum authorised draught and minimum depth.

Minutes – CSPCWG9:

8.14. Maximum draught areas (IT)

Docs: CSPCWG9-08.14A Maximum draught areas

The meeting accepted the proposal for expanding the use of ‘maximum authorized draught’, but considered that it should not be added to the fairway specification; it would be more appropriate to provide a new specification (place to be determined) and new symbol (INT1 I26). For completeness, a specification and symbol for minimum depth should also be included.

ACTION 36: Secretary to draft new specification on maximum draught and minimum depth (and consider placement in S-4). New Work Plan item.

ACTION 37: INT1subWG to include symbols for maximum draught and minimum depth at I26/27.

CSPCWG Letter 07/2013:

ACTION 36: Secretary to draft new specification on maximum draught and minimum depth (and consider placement in S-4). New Work Plan item.

A short section on maximum draught and minimum depth already exists at B-432.4, which can be amplified. A cross references from B-410 is useful.

A question arises about the colour of the legend:

- At present, we use magenta for maximum draught in fairways (and by extension in other routeing measures). However, we use black in recommended tracks (which is where the < > symbol derives from) and in fish havens. As a regulatory concept, perhaps we should be consistent and always show in magenta (and that would be consistent for recommended tracks with the treatment at M5 of other regulatory information combined with a black track). It would mean further changes at B-434.3 (and INT1 M6) and B-447.5 (M46.2). The latter (fish haven) is unlikely to affect many existing charts, but the former (tracks) would take a long time to change.
- At present, we use magenta for minimum depth in a DW route and Fairway (and by extension in other routeing measures), but black in a dredged area. As minimum depth is a more physical concept than the maximum draught above, black is more logical (and would assist the differentiation between the two). However, it would mean changing B-434.5 (and INT1 M18) and B-435.3f (and M27.2). It may take a long time to change on charts and in the intervening period the black on recommended tracks could mean either maximum draught or minimum depth. (As maximum draught should be less than minimum depth, this may not matter).

The proposals below assume we will not make changes to the existing use of colour.

B-410 REPRESENTATION OF DEPTH: GENERAL

Some of the principles of depth depiction are summarized below (see also B-403.1): ...

- h. For an indication of minimum depth or maximum authorized draught within a channel or area, see B-432.4.**

Note: This will actually become sub-paragraph ‘i’ when the new clarification about sounding selection has been included; see WG9 Actions Group 1 (WG Letter 04/2013 refers).

B-432.4 Maximum draught and minimum depth

- a. In areas where the tidal range is not appreciable, it may be useful to state the **maximum draught** of vessels authorized by a regulatory authority to **navigate pass along** a recommended track (see B-434.3), ~~or within~~ a fairway (see B-434.5b) **or within any other area. The maximum authorized draught must be charted**

between arrowheads, eg: <18.5m> (I26) and should normally be in magenta. Exceptions are on recommended tracks (see B-434.3) and in fish havens (see B-447.5), where the symbol should be black. The size of the legend is at the discretion of the cartographer, but it should stand out clearly from other detail in the area.

Note: The difference in value between the actual minimum depth and the authorized (or recommended) maximum draught will vary according to the situation (eg whether the sections of track are sheltered or not). This will be determined by the regulatory authority.

- b. All other depths quoted on tracks, in deep water routes and dredged channels must indicate the **minimum depth** of water at chart datum (and a survey year date if not maintained), eg: 18.5m (I27), as decided by a port or hydrographic authority (see also B-435.3f). It should be in magenta, except that in dredged areas and channels (where actual depths are not shown) it should be black (see B-414). No statements of minimum depths must be made in changeable areas unless the critical depths are regularly examined and updated. ~~For depths within a Deep Water route, see B-435.3f.~~

Note: I26 and I27 do not yet exist. They can either be included in the next editions of INT1, or could possible justify an NM to update INT1. This question will be put to the INT1subWG at their meeting in July.

CSPCWG Letter 07/2013 – Summary of Responses:

36	Do you agree <u>not</u> to rationalise the use of black (for minimum depth) and magenta (for maximum authorized draught) because of the extent of change required to existing symbology, likely confusion as the mix would be present on charts for many years?	BR, CA, DE, DK, ES, ESRI, FI, FR, GR, IT, JP, LV, NO, NZ, SE, UA, US	AU
	Do you agree with the proposed wording of new subparagraph B-410h?	AU, BR, CA, DE, DK, ES, ESRI, FI, FR, GR, IT, JP, LV, NO, NZ, SE, UA, US	
	Do you agree with the proposed changes to B-432.4? Chairman: This action requires further discussion, see letter and my comments to AU.	BR, CA, DE, DK, ES, ESRI, FI, FR, GR, IT, JP, LV, NO, NZ, SE, UA, US	AU

CSPCWG Letter 13/2013 – National comments relevant to Action 36 and Chair comments:

AUSTRALIA

Action 36: Minimum depth and maximum authorised draught

The use of the symbols “◊” as an indication of the maximum authorised draught were introduced as this was a reference to “maximum authorised draught” that existed in INT1 in relation to recommended tracks (M6), and therefore considered something historical that the mariner could relate to. CSPCWG has previously agreed that this is not an intuitive symbol (I sometimes wonder what would be the symbol for a one-way track (M5.1) with maximum authorised draught), but rather a way of combining the “two-way” nature of the recommended track with the maximum authorised draught at M6.

The “minimum depth” along a track or routeing measure is a physical surveyed value, and therefore should be in black. The “minimum [maximum] authorised draught” is a declared (regulatory) value only and should be considered to be information “superimposed on the physical feature and not implying any permanent physical obstruction” (B-142.1 first bullet point), and

therefore should be in magenta (unless both are the same in which case the value should be considered to be a physical value). Australia considers the current issues in INT1 of having some physical depths shown in magenta and regulatory depths shown in black to be a mixing of concepts that is perhaps based on older manual compilation and colour separate printing processes. To be consistent with the use of colour guidance at B-140, Australia suggests the following:

- A new bullet point added at B-142.2(3) indicating that maximum authorised draught is to be indicated in magenta (do not consider that any qualification is required at B-141 second bullet is this refers to “physical (solid) features”, unless CSPCWG thinks there should be a reference to B-142.2(3)).
- Amend clause B-414 and sub-clauses to include guidance and examples of dredged areas with maximum authorised draught in magenta. Similar changes required for INT1.
- Amend clause B-434.3 to have the maximum authorised draught value quoted in magenta (<> symbols should remain in black), and add a new paragraph and symbol (also required for INT1 (split into M6.1 and M6.2?)) to have an example of a track having minimum depth quoted in black. [Chairman: this would be a new symbol; is there any requirement for it?]
- Amend clause B-434.5 to have minimum depth (example (a)) quoted in black, and remove magenta “<>” from example (b). CSPCWG/INT1 Sub-WG discussion required as to whether both examples need to be included at INT1 – M18.
- Amend B-435.3(f) to have minimum depth quoted in black (same for INT1 – M27.2). CSPCWG/INT1 Sub-WG discussion required as to whether guidance for maximum authorised draught is required in S-4, and additional symbology in INT1.
- Amend B-447.5 4th paragraph and example to have maximum authorised draught quoted in magenta.
- New INT1 – I26 should be a value in magenta, and I27 should be a value in black.
- All existing symbols that have been changed in INT1 to be labelled as obsolescent.

There may be other changes required to S-4 (and possibly INT1) which would require a more thorough investigation. However, Australia considers that standardising the representation of minimum depth and maximum authorised draught in accordance with existing S-4 convention (B-140), rather than mixing concepts now when we are trying to introduce new information to the mariner, and thus further exacerbating the issue, is the best way to go. **Agree that there is a degree of hurt with this approach**, but we should be addressing this now rather than later when it may be too late.

B-432.4: Refer to above comments.

Chairman: Despite the almost unanimous vote, AU has a point and I would like AU to present these arguments at CSPCWG10 (agenda item 8.2 refers). A key question may be ‘how much hurt?’ – see highlight. Jeff: please also take account of FI and IT comments below in your paper.

Accordingly, we will progress the remaining actions (or already have) and continue this discussion at CSPCWG10.

FINLAND

Action 36: What if the maximum draught is associated with ESSA? Should it be in magenta or green?

Chairman: This will depend on outcome of WG9 ACTION 22: AU to continue discussion on dividing regulatory from navigational restrictions (for S-101), keeping Secretary informed.

ITALY

Action 36:

B-432.4:

1) We suggest that the end of the first sentence be modified as follows:

a.a fairway (see B-434.5b) or within any *regulated area* (see B-439.1).

In this way we give some instructions on how to represent the limit for an area where a maximum draught has been defined.

2) We suggest that the following be inserted at point b:

b.in deep water routes and dredged *areas or channels*....

3) Where a maximum draught has been assured/defined by regulatory authority, in order to avoid confusion by the chart user, we suggest that soundings, depth contours and depth areas, already represented into the area, be deleted.

Chairman: We have asked AU to include these suggestions in his submission to WG10.