CSPCWG7-09.2A

7th CSPCWG Meeting
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Paper for Consideration by CSPCWG

Colours under bridge lighting

Submitted by:	UK
Executive Summary:	UKHO was recently challenged by a chart user on the best lighting to be used for reading charts.
Related Documents:	S-4 B140; B470.4
Related Projects:	None

Introduction / Background

UKHO received a challenge from a chart user, who was also planning an article for a shipping magazine, on the best lighting conditions for viewing charts. Although he was asking from the perspective of choosing appropriate lighting on a bridge, rather than choosing appropriate colours to use on a chart, he raises a very valid issue. We have mentioned this issue in passing when discussing the guidelines in S-4 for multicoloured charts, but have not had a dedicated discussion on the subject.

The customer expressed surprise at the possibility that

> 'no work has been carried out on how colour-significant symbols may change colour when viewed in different coloured lights?'

UKHO's reply (drafted by CSPCWG Secretary and Chairman) may be of interest to WG members:

> UKHO is well aware of the effects of different types of lighting on the ability to read paper charts. But in practice, as varying lights are in use in vessels worldwide over which UKHO has no control, UKHO's research has mainly been from the perspective of choosing chart colours which will be visible under typical low intensity bridge lights, rather than your specific enquiry of assessing what colours of light are best for viewing a chart.
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> The brighter and whiter the light (i.e. the closer to replicating full daylight conditions), the easier the chart will be to read. However, bright bridge lights impair night vision, so subdued lighting is necessary on the bridge. White light is usually avoided, due to perceived increased impairment. The typical preferred lighting was judged to be red, particularly by a significant user of our charts, the Royal Navy. But all coloured lights will affect perception in some way. When magenta was being introduced into the standard chart colour scheme, experiments showed that it tended to 'disappear' under red bridge lights, so some black was added to the magenta ink specification on Admiralty charts to compensate (i.e. to 'strengthen' the colour); this is why the 'magenta' colour on Admiralty charts is now darker than on most other nations' charts and is actually closer to purple. Whilst this presents a clearer portrayal in subdued light conditions, it may sometimes have an adverse effect as clashes of chart detail, respectively printed in black and magenta, can be more difficult to distinguish. In summary, the best lighting for reading the chart (and other documents on the bridge) whilst retaining night vision is always a compromise.
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> To further complicate the picture, some nations have introduced additional colours on their charts. Partly because of arrangements with other hydrographic offices for reproducing foreign charts into the Admiralty series, and partly because of increasing clutter of information on charts, UKHO has just begun introducing additional colours on selected Admiralty charts. Accordingly, we have been careful to choose a colour palette which should be visible under bridge lights which contain at least an element of white in the make up. Under any purely red bridge lights, some colours may

‘disappear’. As we produce increasing numbers of 'multicoloured' charts, we would welcome any feedback on readability under all types of bridge lights noting that, in recent times, more attention has been given to studies on the colour palettes and vision settings for ECDIS screens rather than paper charts.

You may also wish to consider seeking the advice of the Maritime and Coastguard Agency to ascertain whether they take a view on the matter of optimum light settings.

Analysis / Discussion

Relevant S-4 extracts:

B140

> It is important that all colours are visible under the coloured filters used to subdue bridge lighting. This requirement is often met by mixing a certain amount of black into colours, such as red and magenta, which might otherwise prove difficult to see.

B470.4b

> Colours for flares and sector arcs should be chosen to be easily distinguishable from any background tint. They should also be tested for visibility under vessels’ bridge lighting.

WG members are invited to add any information from their own research into the effects of bridge lighting. This may include lessons learnt from ergonomic and colour perception studies in the development of ECDIS displays. Is there a case for strengthening the advice to chart producers on the effects of bridge lights on colours, and/or for advice to shipping agencies on the types of bridge lights recommended for reading coloured paper charts?

Conclusions

None.

Recommendations

None.

Justification and Impacts

It is possible that some producers’ multicoloured charts are difficult to read under some typical bridge lights. Ways to alleviate this situation warrant exploration.

Action required of CSPCWG

The CSPCWG is invited to discuss the issue detailed above.