



NorthStandard

ECDIS – Safety Settings



SHIPS

ECDIS – Safety Settings

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Introduction

Since their implementation, the Electronic Chart Display and Information System (ECDIS) and Electronic Navigational Charts (ENC) have rapidly become the primary means of navigation on board many vessels.

There are many benefits to using ECDIS over paper charts. However, one of the primary benefits is the ability, when used correctly, to let the user know when the vessel may be heading into dangerous waters by using safety settings based on the vessel's condition. But these safety settings must be understood and used correctly to ensure the benefits are realised.

In this briefing we will look at the safety settings available to the ENC user, what they are and how to use them.

There are a number of user-defined safety settings available on ECDIS. It is important that the user understands and sets these correctly. The shipping company's policy and the vessel's safety management system (SMS) should be referenced to see what is required for each vessel.

Here we look at each of the safety settings.

Safety contour

This is the primary safety feature on the ECDIS. It is set by the user and marks the boundary between safe water and shallow water.

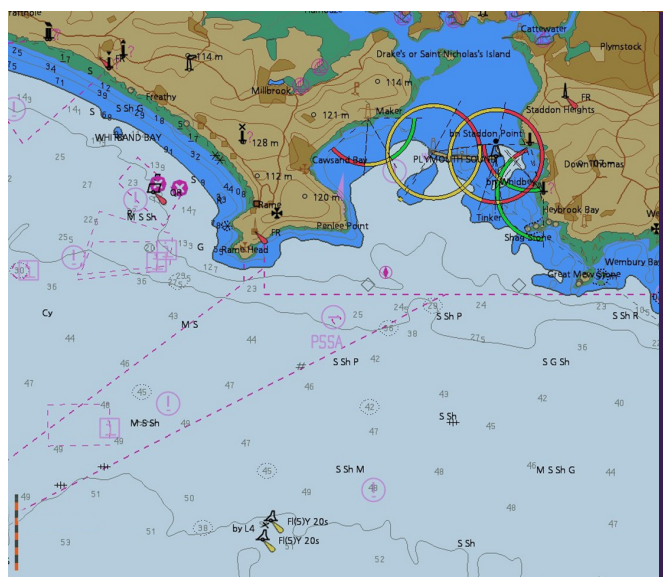
How does it do this?

Before departing port, the ECDIS user must set a value for the safety contour. This should take into account the vessel's draught and required under-keel clearance. The quality of the ENC data available must also be considered.

The safety contour shows on the ENC as an extra wide isoline.

Users should check their SMS for the procedure on setting the safety contour. If it is not set, the ECDIS default value for the safety contour is 30m.

In this example we can see that the safety contour is set to 10m (note the bold 10m isoline).



Example of a 10m safety contour.

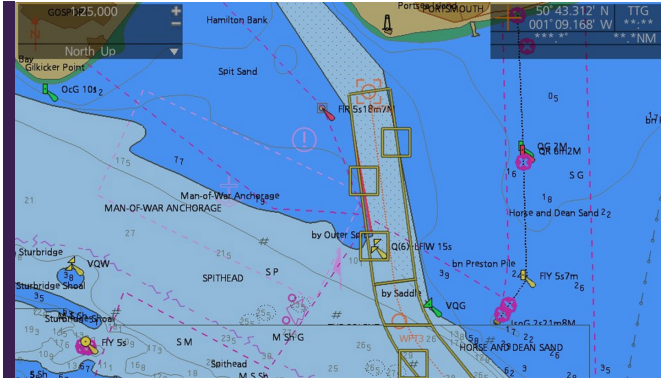
What happens when you get near a safety contour?

When the ECDIS is in monitoring mode (in use on passage), if the vessel's watch / lookahead vector crosses a set safety contour the user will receive an audible alarm.

The safety contour is the only automatic audible alarm on ECDIS. If the user wishes to have other features – such as wrecks or underwater obstructions – raise an audible alarm, then they must set this themselves when planning the passage as the normal ECDIS default for such objects is only to visually highlight these.

ECDIS – Safety Settings (cont.)

You can see this on the below ECDIS screenshot; buoys and other obstructions are merely highlighted in yellow (no audible alarm), but there is a red alarm where the safety contour enters the watch vector area.



Show buoys highlighted in yellow and the safety contour in red (audible alarm)

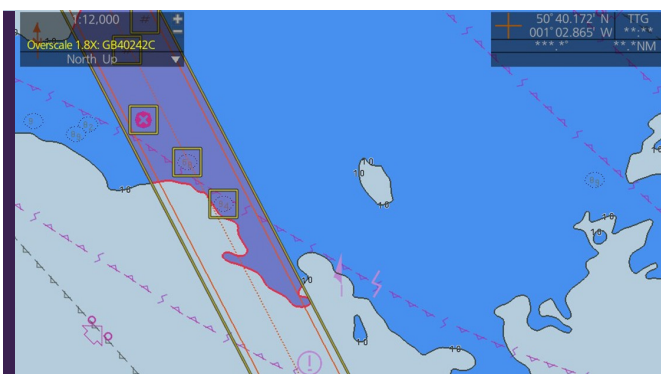
Availability of depth contours

The use of the safety contour can only be accurate if the ENC data within the ECDIS contains enough depth contours.

When ENC's were first introduced, most makers used their paper chart series as the source for their data. Unfortunately, this led to some issues, and today many ENC's only contain the standard series of contour lines taken from the old paper chart.

As such, when building the chart display and a contour line is not available, the ECDIS software will draw the next available deeper depth contour in the ENC with a thick bold contour line and shade all areas of the chart between this depth and the zero-metre drying line in a dark blue shallow water colour.

In the below example, the safety contour is set at 6m, but no 6m contour line is available. Therefore, the 10m contour line is the next available deeper depth.



You can see an alarm raised on a 10m contour line is the next available contour after 6m.

Confidence in the data

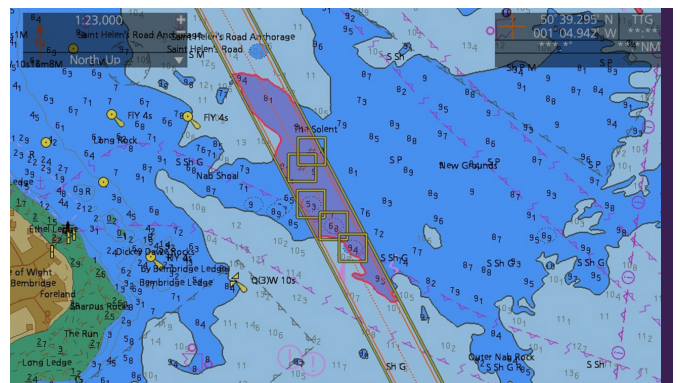
When setting a value for the safety contour, not only should the user consider draught and the under-keel clearance requirements but also the accuracy of the ENC hydrographic data.

If the ENC in use for a certain leg of the passage shows a low 'Category Zones of Confidence' (CATZOC), then this should be accounted for when setting the safety contour. For more information on ENC accuracy see

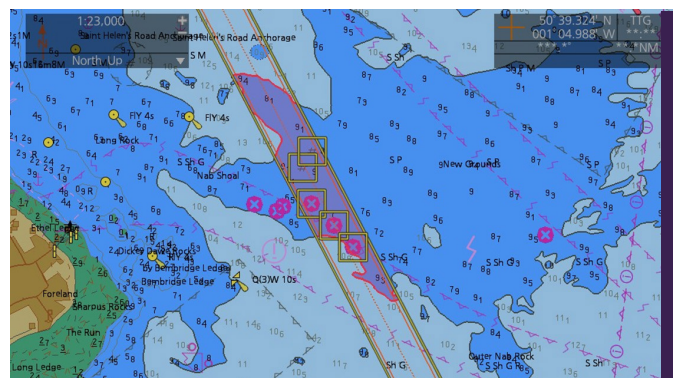
Loss Prevention - ECDIS ENC Accuracy

Sometimes, due to the limited availability of contours in ENC data when navigating near the coast, the vessel will need to navigate inside the safety contour. To improve situational awareness for the user, the latest S-52 standards gives the user the flexibility to turn on the isolated danger symbols to display behind the safety contour in potentially dangerous areas.

As you can see in the below examples Screen One shows the soundings inside the safety contour, Screen Two shows isolated dangers instead.



Screen One: You can see here the soundings less than the safety contour setting are being highlighted.



Screen Two: You can see the isolated danger symbols turned on within the safety contour to improve situational awareness.

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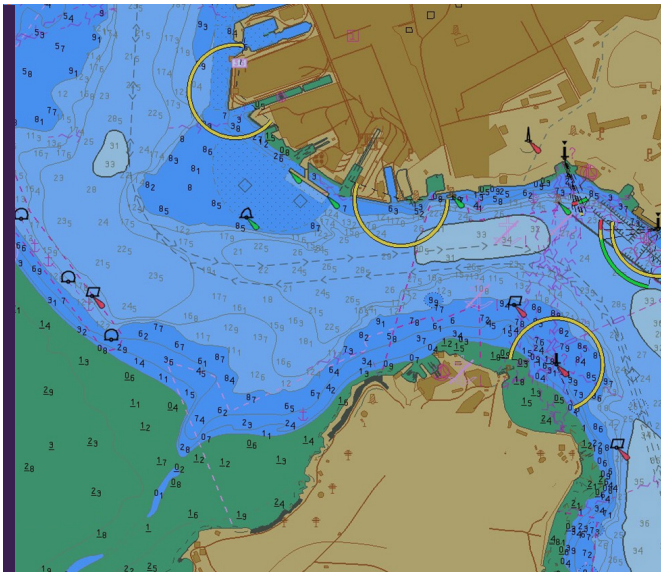
ECDIS – Safety Settings (cont.)

Safety depth

As described earlier, because of the limited availability of contour lines (commonly to 2m, 5m, 10m, 20m 30m and 50m) this limits the effectiveness of the safety contour, the ECDIS user can set up safety depths independently of the safety contour.

The ECDIS will then display any sounding with a value equal to, or less than, the safety depth value in bold to make them more prominent.

In the below example you can see that the user here has set a 10m safety depth, therefore all depths equal to or less than that are in bold.



10m safety depth setting

Shallow and deep contours

Before discussing shallow and deep contours, the user must understand depth shades of an ECDIS.

Depth Shades

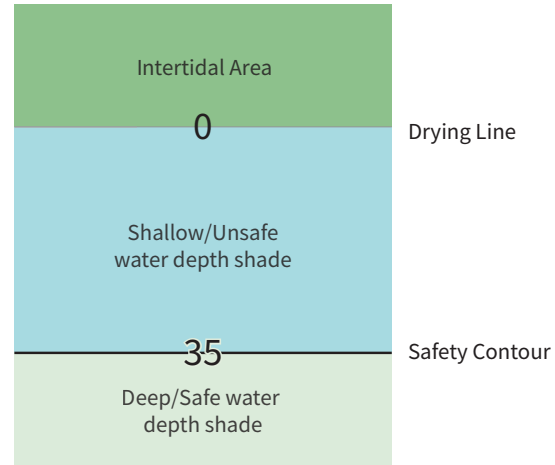
The user has the option of selecting a simple two-colour shading, or a more in-depth four-colour shading.

To enable the use of the four-colour option, the user can set what are called 'shallow' and 'deep-water' contours in addition to their set safety contour.

Two depth shades

This is the default setting and will only show two depth shades in addition to the inter-tidal area which is exposed at low water:

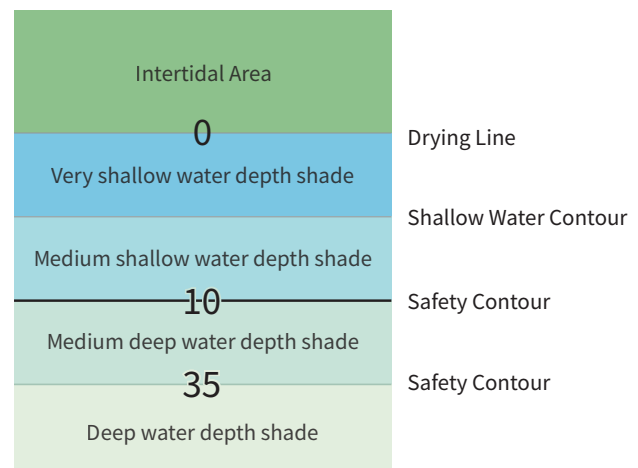
- Shallow / unsafe waters - Between 0 metres and the safety contour
- Deep / safer waters - Deeper than the safety contour



Four depth shades

If the two depth shades option is turned off, the system will switch to displaying four depth shades option using values that are set for the shallow and deep contour:

- User defined shallow contour
- User defined deep contour



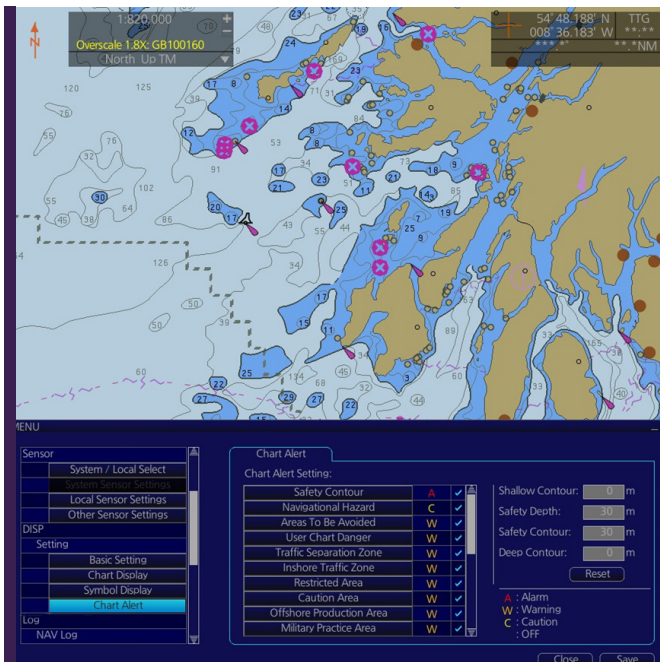
The use of four depth shades reduces the contrast difference between adjacent depth areas. This may make it more difficult to distinguish between safe and unsafe waters under certain lighting conditions, particularly at night where its use is not recommended.

ECDIS – Safety Settings (cont.)

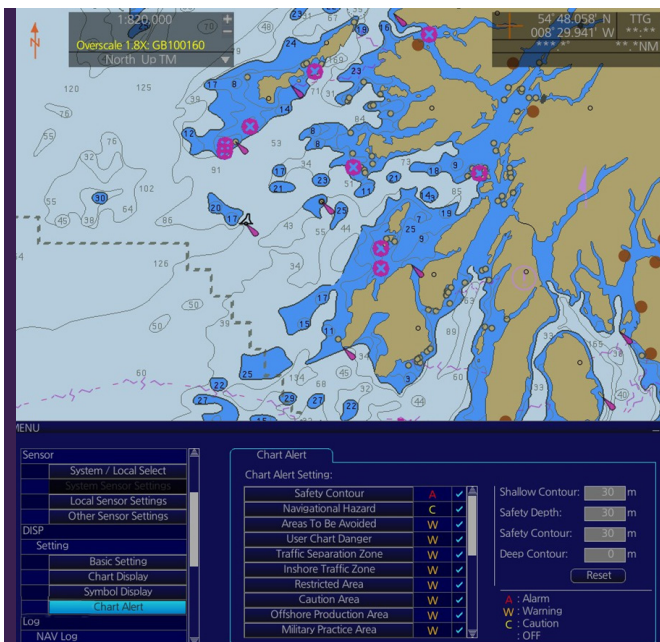
Shallow contour

The shallow contour value is set by the user and is used to determine all areas shallower than this value.

The below first image shows an ECDIS with the shallow contour switched off, and the second with the shallow contour on, illustrating the difference in colours:



Shallow contour switched off



Shallow contour switched on

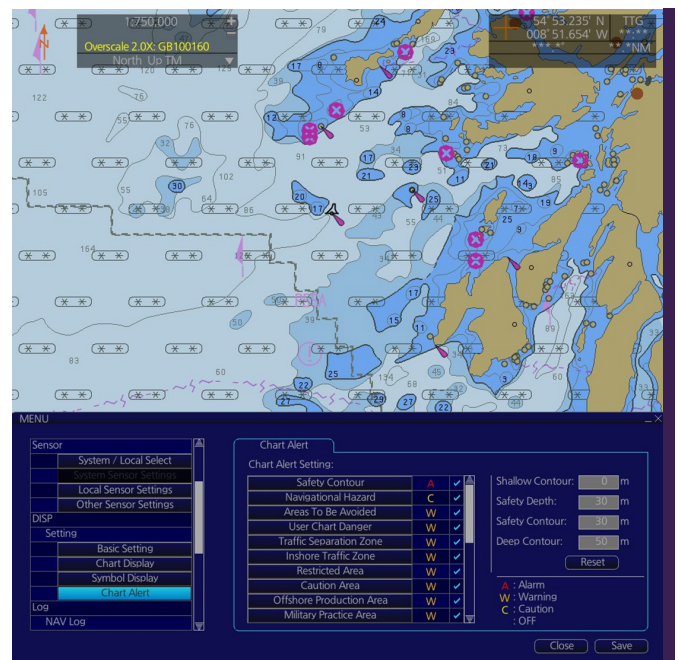
Deep contour

This indicates the limit of the sea area where 'shallow water effects' can affect the vessel.

It shows the user what the passage plan thinks is deep water. This could be, for example, twice the deepest draft, or 100m in open sea passages. You should consult your SMS for details.

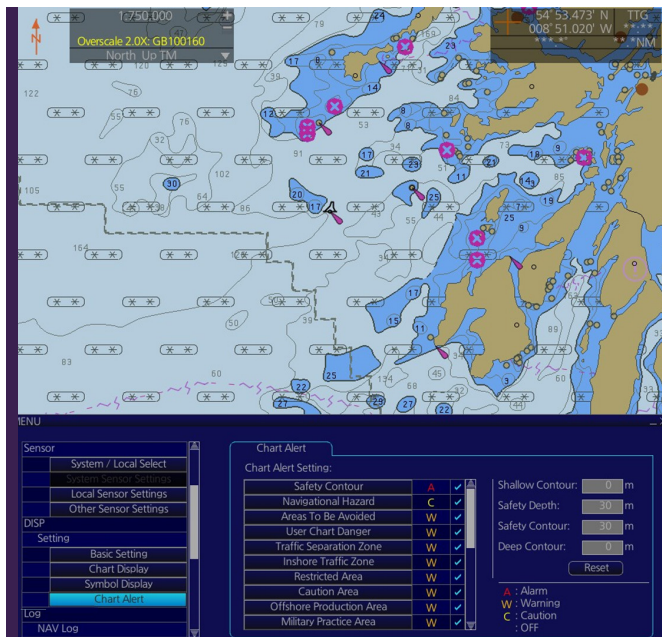
When 'four shades' mode is activated, the display will show shallow and deep contour as two additional blue-coloured patterns on the chart panel. While activating the shallow pattern will cross out non-navigable, unsafe water, this can lead to a cluttered screen.

Look at these two examples, one has the deep contour on set at 50m, you can see the additional blue shaded areas. The other has the deep contour switched off.



Deep contour set to 50m

ECDIS – Safety Settings (cont.)



Deep contour off

Route check function

When the user has completed planning the intended passage, it is possible to check that the route is safe by using the ECDIS route check function.

This checks that the planned route is safe, based on the vessel's characteristics, and importantly it is free from any charted dangers based on the entered safety settings.

Therefore, the user must ensure that the appropriate safety contour and depth settings are entered before starting this check.

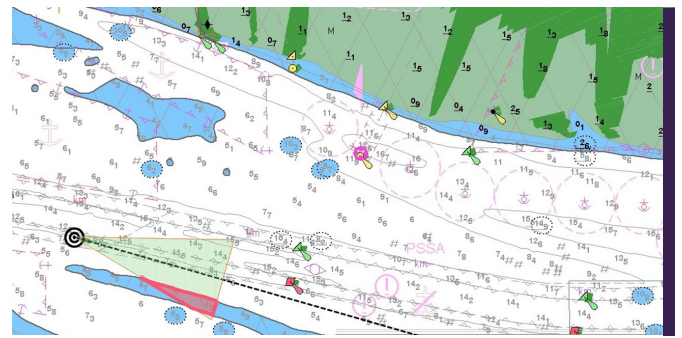
Lookahead function

The 'lookahead' or 'watch' vector is selected by the user and is expressed either as a distance or a time.

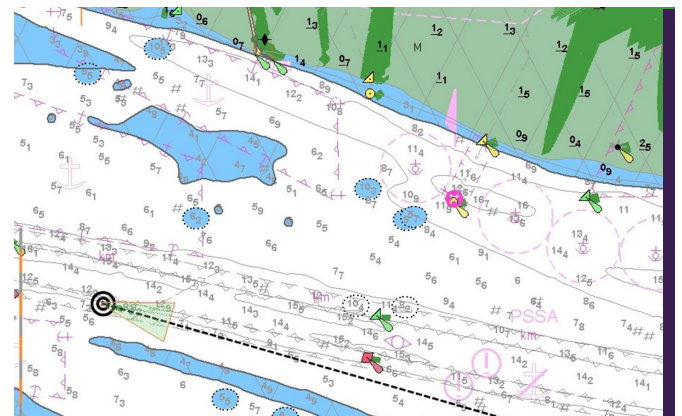
Remember that if the watch vector crosses the safety contour it will raise an audible alarm, so it is very important that the user has an appropriate watch vector set at all times.

The setting of the watch vector may need to change throughout the passage. For example, if the vessel is in open water, then a longer / larger watch vector may be more appropriate. However, in confined waters this could mean frequent needless alarms, therefore you may wish to set a shorter / smaller watch vector.

In the below examples we can see a vessel doing the same passage, but one has a longer watch vector meaning that it more frequently crosses the safety contour, causing more frequent alarms. The other has shortened the watch vector to a more suitable length.



You can see the longer watch vector crossing the 5m safety contour and alarming.



In the same situation but with a shorter more suitable watch vector.

Practical guides on ENC use

There are several publications available from national hydrographic offices containing information regarding ECDIS use.

With regard to the practical use of safety settings the following are recommended:

- UKHO NP231 Guide to the Practical Use of ENCs.
- IHO S-57 IHO Transfer Standard for Digital Hydrographic Data.
- IHO S-52 Specifications for Chart and Display Aspects of ECDIS Edition 6.1
- IHO Presentation Library S -52 Annex A Edition 4.

NorthStandard have produced an **onboard ECDIS training pack** where the ECDIS user is set tasks using the onboard ECDIS with the aim of improving equipment familiarity.

ECDIS screenshots not to be used for navigation.

All ENC images courtesy of the UKHO.

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