

INSERVE

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Chart work

Good and bad practice

Introduction

In our line of business we see both good and bad practices in all marine departments. The purpose of this paper is to help explain how to recognise what the deck officers are up to with their chart work practices. This is one of the basic areas where poor practice has brought about groundings even when the vessel is well equipped with all the latest equipment.

World Geodetic System (WGS 84)

This is the internationally recognized geographical grid that all surveys from 1984 have been referenced to. It is the grid that all GPS systems are working on.

If you look on a chart there is normally a reference to the system. Often in the top left hand corner there is a large magenta coloured **WGS84**. When you see that it means the grid of the chart is the same as the one that GPS systems are working on.

Look further on the chart you will see some notes on the subject. These notes are of interest to the navigator and they are rarely read and are usually different.

Even though the chart is WGS84, the original survey on the chart may date back a few hundred years. There is sometimes a reference to this fact on the chart.

Sometimes the charts are not WGS84 and there is a reference on the chart that all positions need to be moved in one particular direction.

Sometimes there is no reference to WGS84. This is of vital interest as it means that the chart was produced before 1984 and navigating with GPS on it needs to be treated with suspicion by the navigator.

What this means is if the navigator is using just GPS, he may know where he is very accurately but not with reference to the land. He must check his position in relation to the land with other means and he must use the radars and visual bearings to get his position in relation to the land.

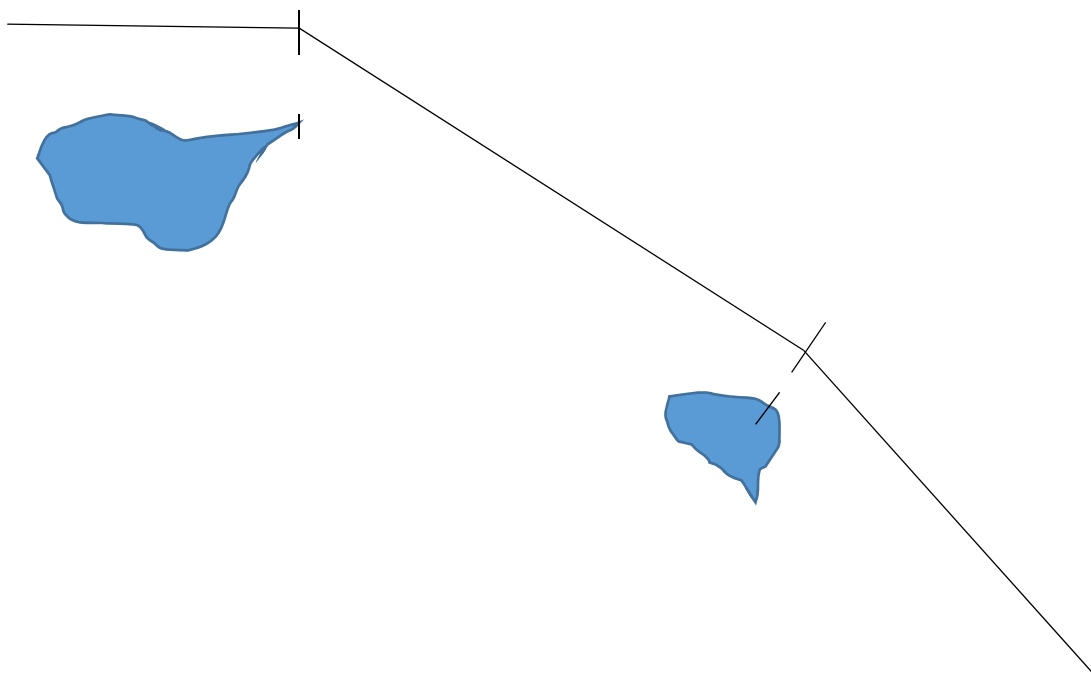
In general, I have found that a lot of navigators are not aware of this. Of the ones that are aware of the issues, there are many who are lazy and cannot be bothered to check. As a general rule most ships have poor chart practices.

Plotting a course on a chart

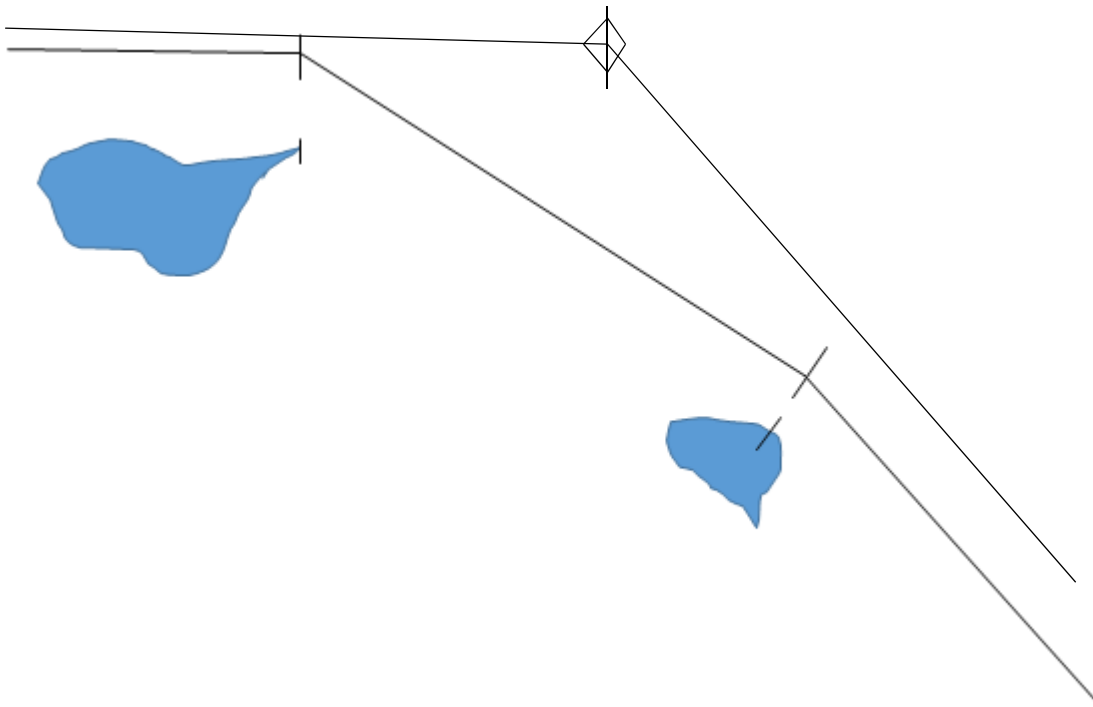
The most fundamental part of passage planning.

This has historically been the job of the second mate. Before the use of electronic charts the second mate would get all the charts out for the particular voyage. He would begin by drawing courses from one headland to another. Each alteration of course would generally be made when the headland was on the beam. As he did this he would be examining the chart for areas of concern. Sometimes the master might give him a direction that he wishes to stay a minimum distance off land by a specific amount.

By doing this the second mate became very in tune or situation aware of the land and its hazards. You can still see this being done occasionally.



What has changed now is the way in which a passage is being drawn. Most second mates are using a laptop, they might say that they are not but that is what it looks like to me. They have a basic set of charts on the laptop and make a minimalistic series of courses. They then transfer the co-ordinates on to the paper chart. The less co-ordinates there are the less work for the second mate.



What is happening now is instead of navigating by land marks we have a system of navigating by way points. The navigator is becoming less aware of the land, quite often the course is less fuel efficient. On a number of occasions these minimalistic waypoint courses have also put the vessel perilously close to navigation hazards.



Above is an incident we dealt with recently. I have marked two waypoints that were marked on the chart in orange. They have been used to draw the courses in. They really do not make any sense and in this case the vessel ran straight into the rocks. In this case the second officer and eventually the

whole navigating team had managed to lose all situational awareness and were just concentrating on keeping the ship on the course which unfortunately ran onto the rocks.

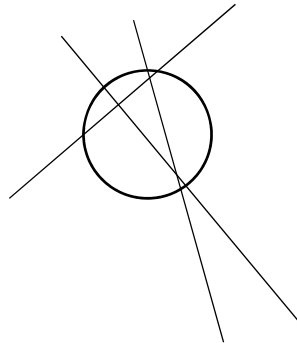
Position fixing

By using GPS positions, all the time the navigator again becomes less aware of his distance from the hazards. As I have already discussed it is necessary to use visual fixes and radar fixes. The way in which these fixes are put on the chart is important.

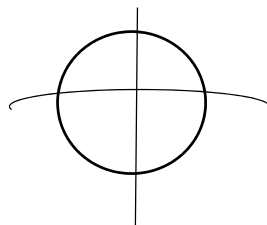
By displaying on the chart how he got a fix the master or relieving officer can know how much reliance can be put on a fix.



Above is the circle with the dot. It does not tell us much, it is usually a GPS position but you cannot be sure.



Above the "cocked hat" position. This has obviously come from three bearings. This gives a good idea on accuracy. The bearings might have been visual or from the radar.



Above is a radar range and bearing. The range is an arc drawn with a set of compasses, then crossed with a bearing.

What should be used is all of the above! GPS, radar and visual. You should see on a chart a number of different types of fixes. If you see a regular series of dots and circles be suspicious. Fixes taken by different means jump about a bit and are irregular. If you fix a position with the radar and then the GPS you can expect to see some irregularity.

In conclusion what I have been seeing is a combination of poor passage planning and poor navigation fixing. This leads to lack of situational awareness. Which leads to a very big BANG!

David Jones, marine surveyor

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