



DR and EP

**A step by step guide working out your position using
dead reckoning and estimating your position**



Introduction

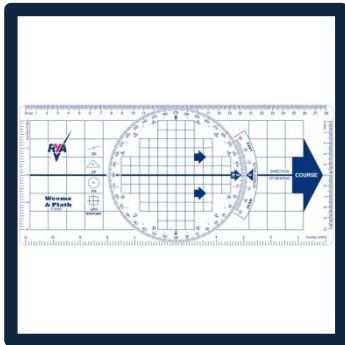
A simple guide to DEAD RECKONING and ESTIMATED POSITIONS

This presentation will take you through a typical scenario showing you how to estimate your position

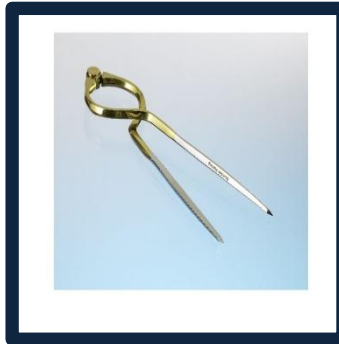


You Will Need

RYA Chartplotter



Dividers



RYA Practice Chart 4

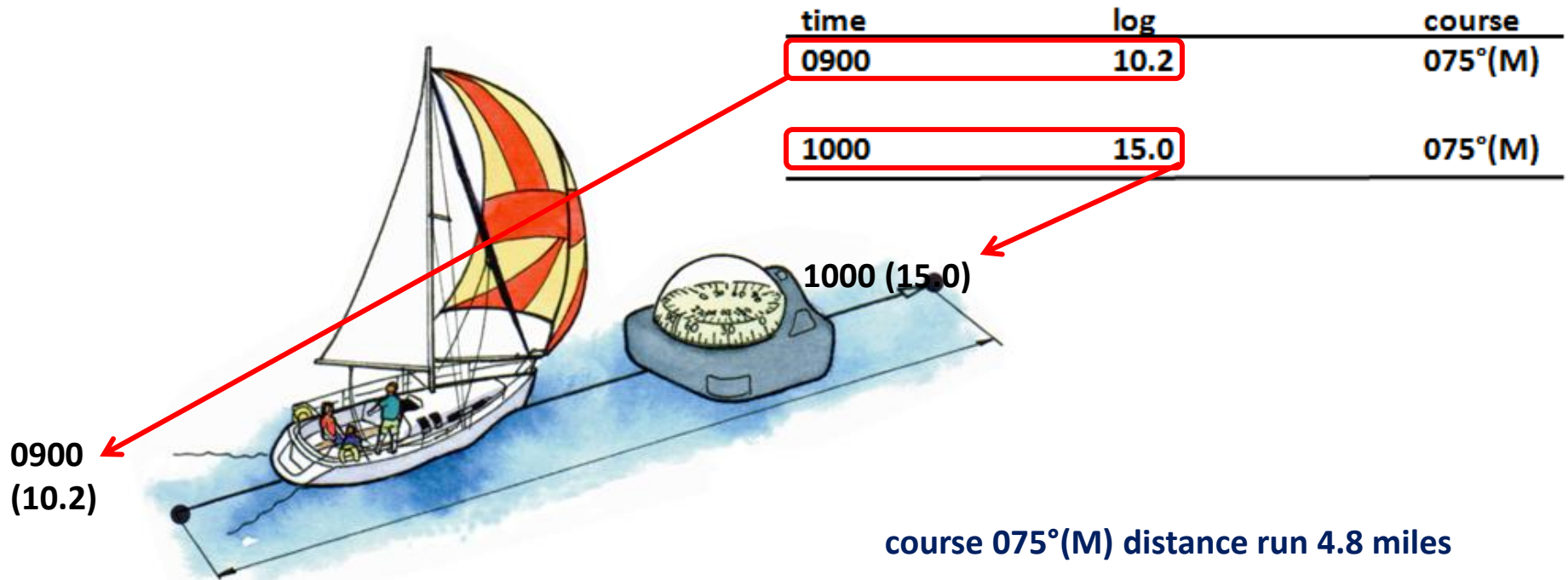


Pad of paper, pencil and rubber



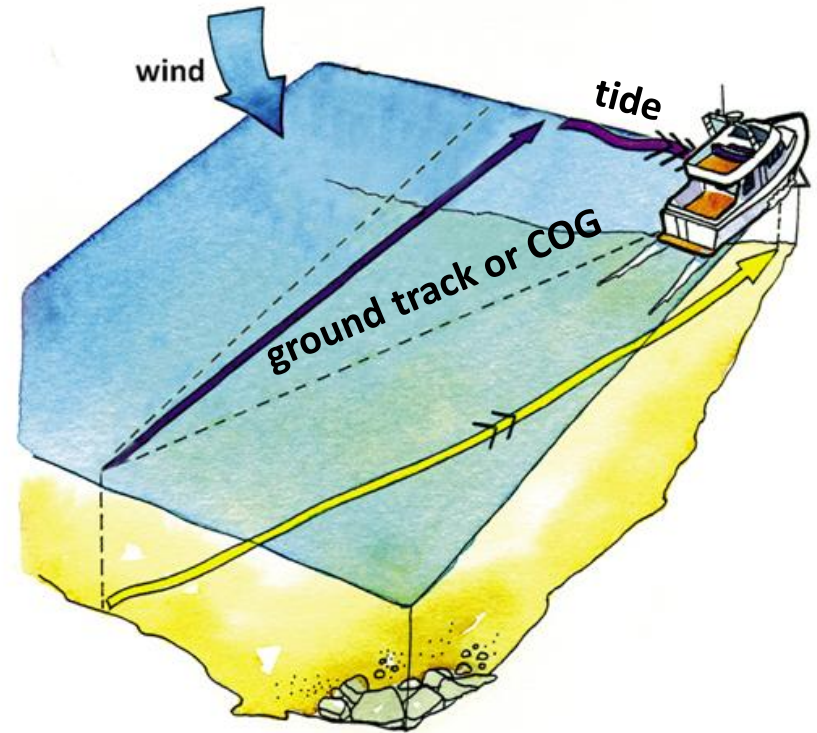
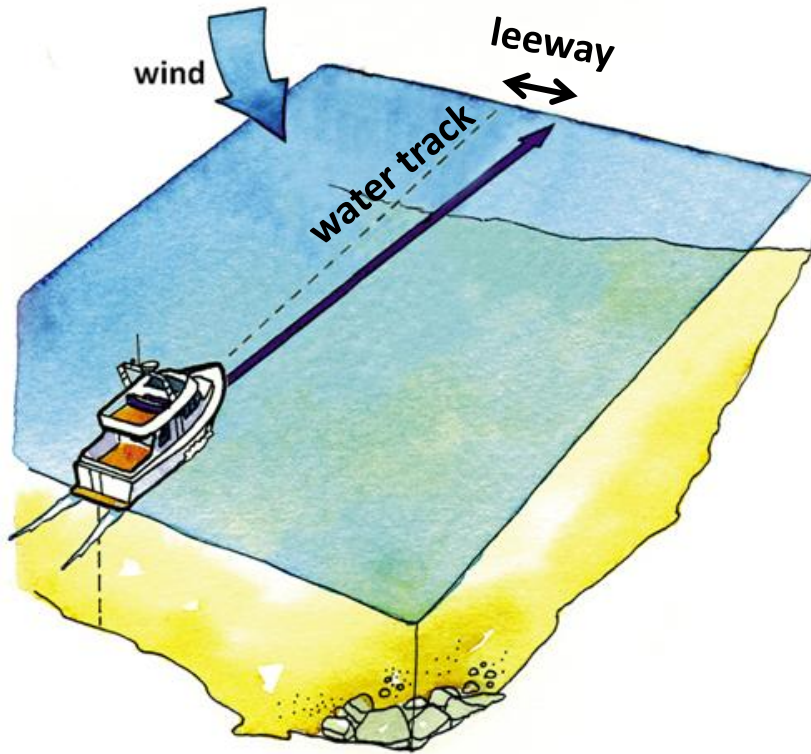
Dead Reckoning

It's possible to reckon your approximate position if you know the course steered and distance travelled



Estimated Position

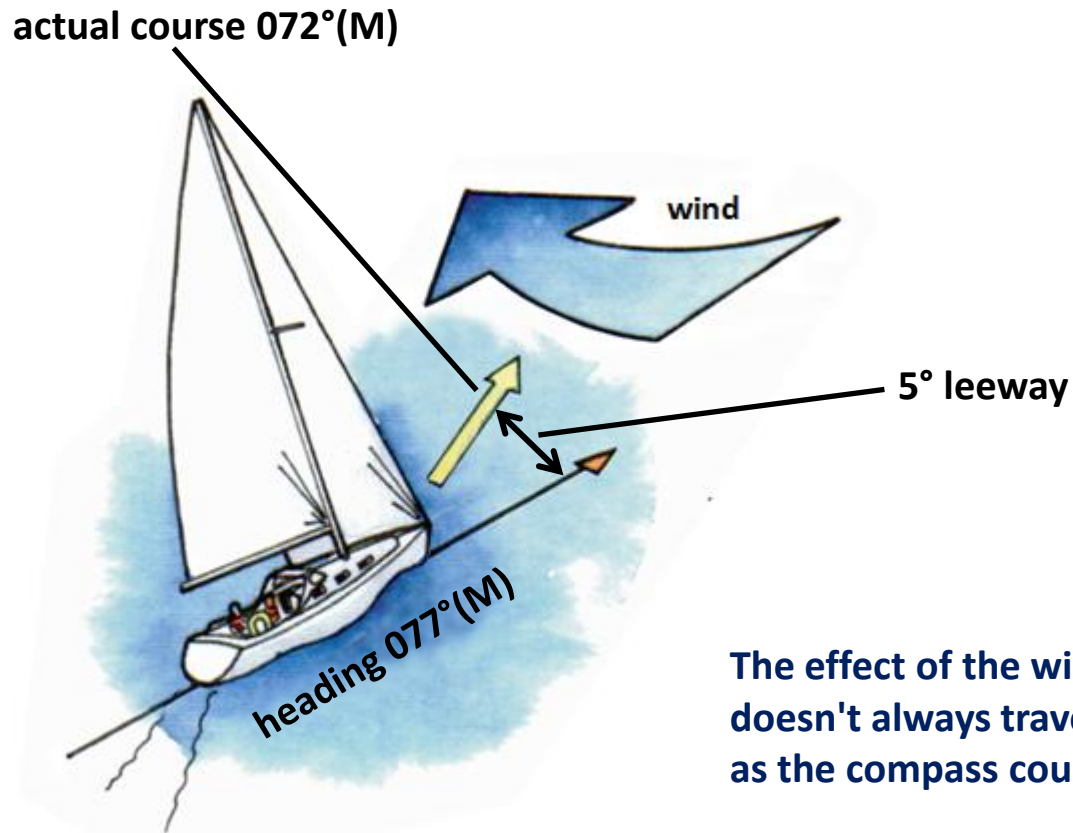
An EP allows for the effects of leeway and tide...



...making it potentially more reliable than an DR

Considerations

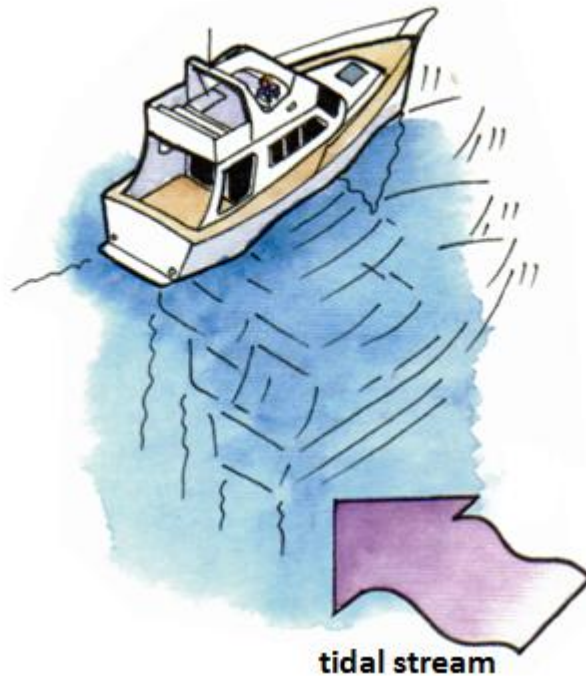
Effect of leeway



The effect of the wind means the vessel doesn't always travel in the same direction as the compass course steered

Considerations

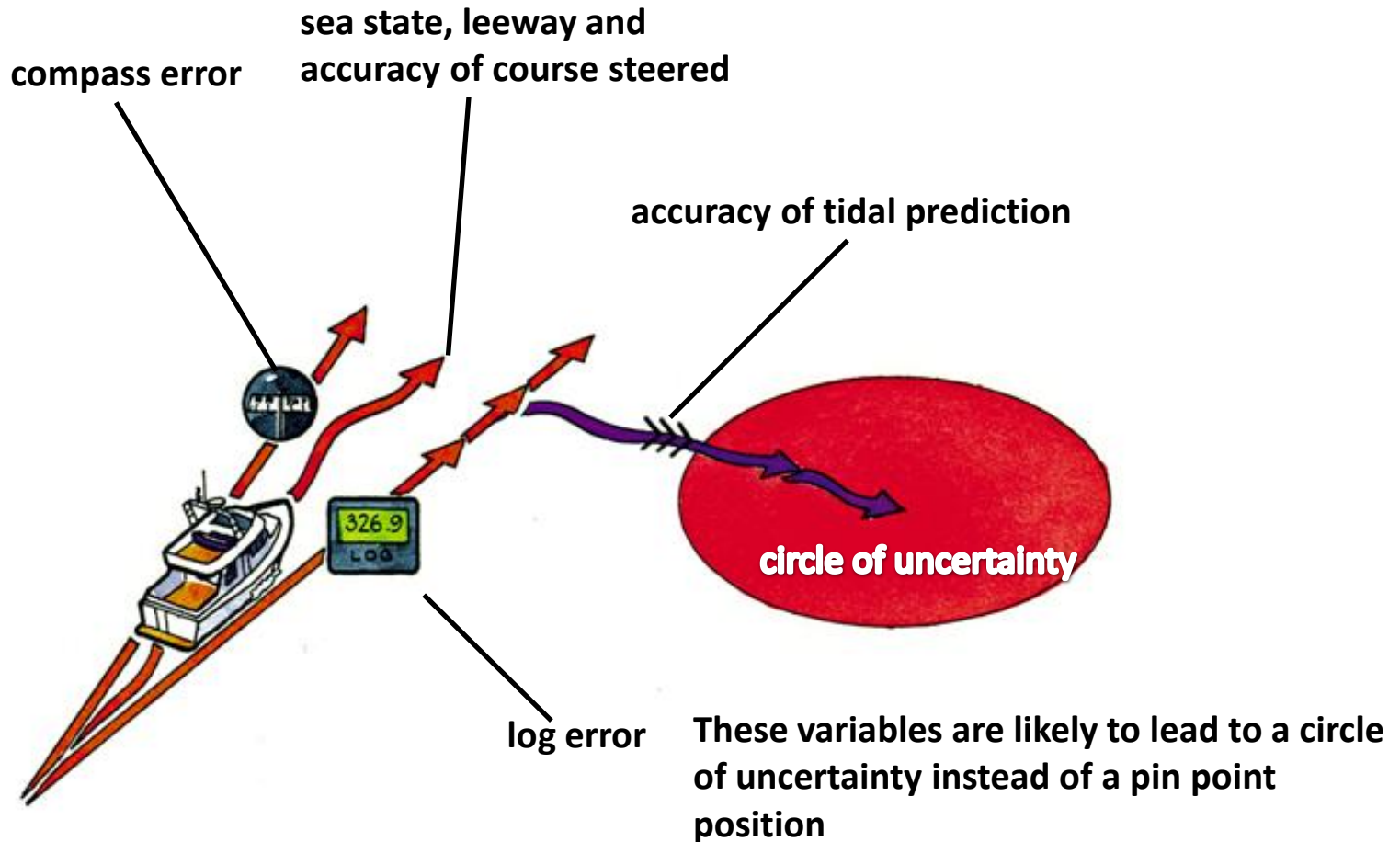
Effect of tidal streams



Tidal streams or currents also need to be considered

Considerations

EP accuracy



Question

You recently have left your home port of **HAMILTON**

- At 07.50 the GPS position is 45 degrees 38'.20N and 006 degrees 15'.00W
- Log reading 4.1m
- Your yacht is on a heading of 330 degrees (M)
- At 09.50 the log reads 13.3m
- The tidal stream is 174 degrees (T) at 0.8 knots for the first hour and 182 degrees (T) at 1.6 knots for the second hour

1. Plot the fix at 07.50
2. Plot the EP at 09.50
3. What is the speed over ground (SOG) and is this more or less than the speed through the water and why?

Plot the GPS Fix

Plot the **GPS** fix using your chartplotter, first, look at the Longitude scale and draw the first position line



Now do the same with the Latitude figure

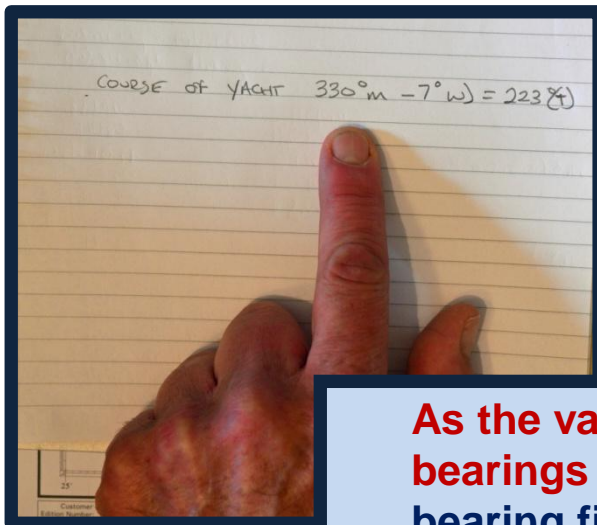
Circle it so you know it is a fix, I add the time next to it and then rub out the fixing lines to keep the chart tidy



Marking the Course

Now you have marked on the chart where you were at 07.50 you can now mark the course and distance your yacht has sailed over the past 2 hours

First, you need to convert the magnetic course to a true one, so look at the compass rose nearest your position – you will see that there is approx. 7 degrees (W) variation

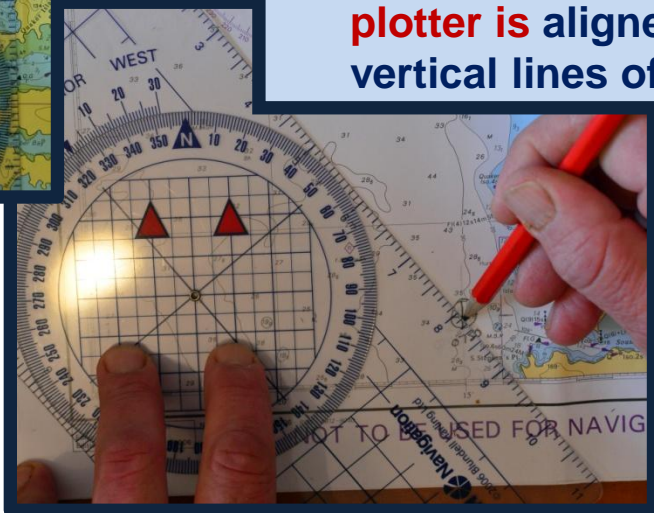


As the variation is west and you are working off magnetic bearings you need to take the variation away from the bearing figures – not add it

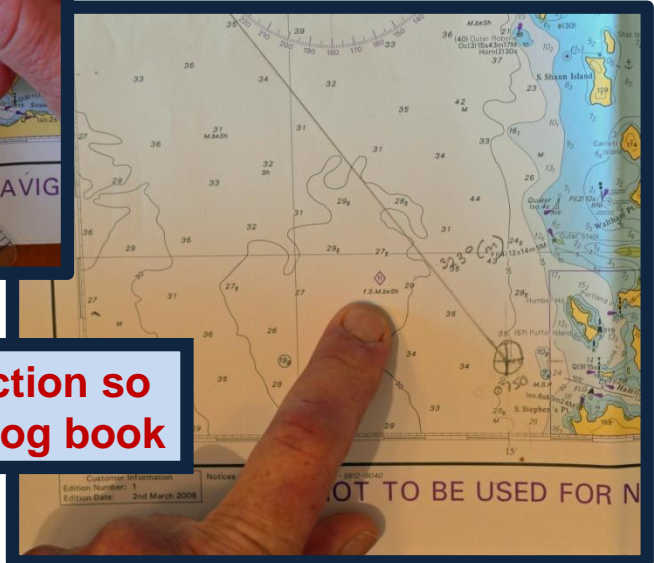
Marking the Course



Taking your chart plotter dial in the first corrected bearing, in this case 323 degrees (M)



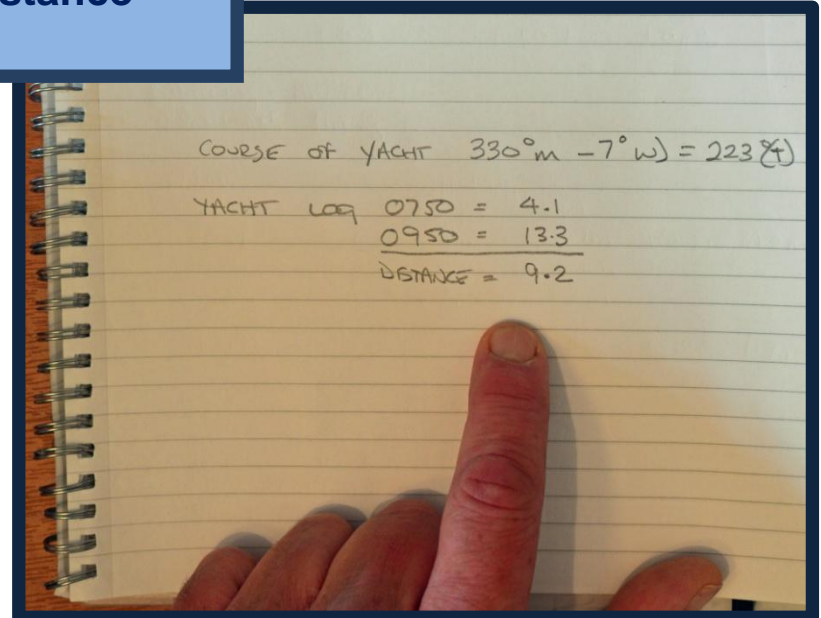
Now, line the plotter from the fix ensuring the plotter is aligned North correctly using the vertical lines of the chart and draw a line



I always write next to the line the course direction so I can easily identify it without referring to my log book

Marking the Distance Travelled

Now, using the log book work out this distance you have travelled, in this case 9.2 miles



Next, using the vertical scale on the chart stretch the dividers to the distance you have travelled. NEVER use the horizontal scale.

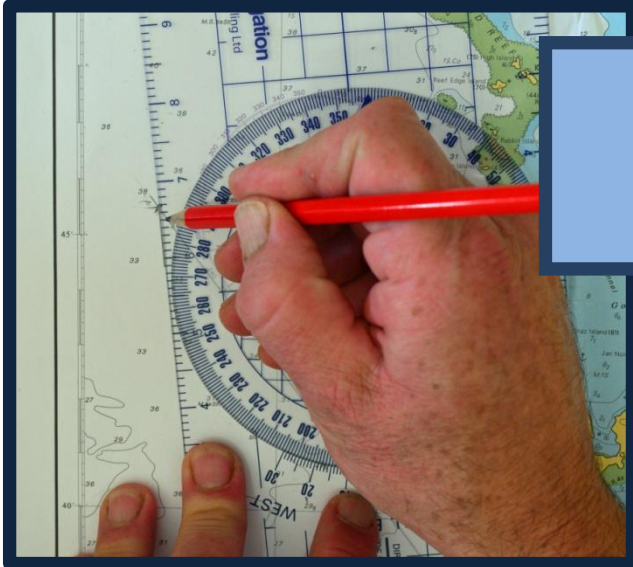
Marking the Distance Travelled

Now put the dividers along the course line and mark off the distance travelled



The next job is to record the distance and course of the tide over the two hours you have been on passage

Make Allowances for Tide




The first hour the tidal direction was 174 degrees (T) and 0.8 knots in strength, so dial in the direction on your chartplotter and draw a line



Now mark off the distance with the dividers using the same technique as described earlier



Make Allowances for Tide



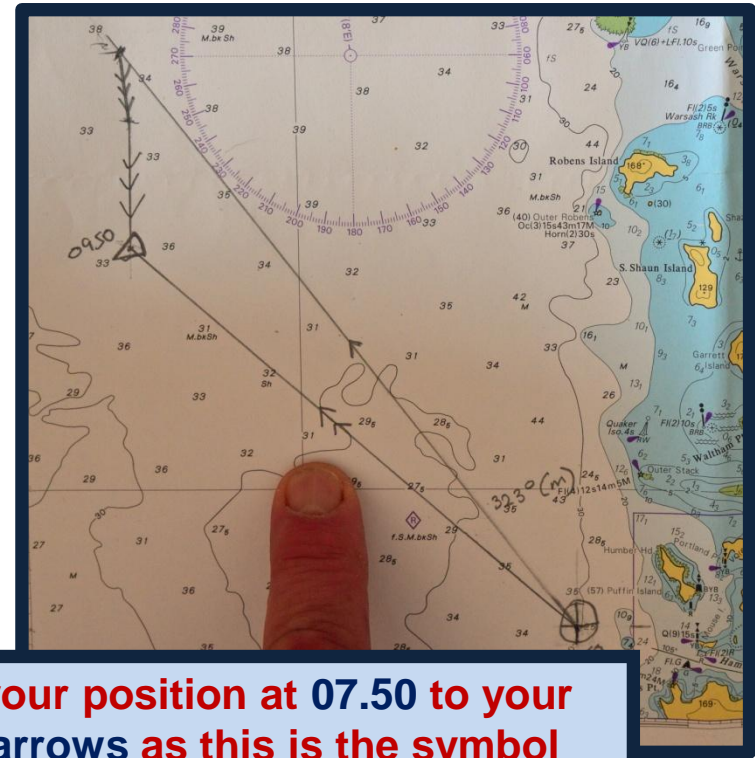
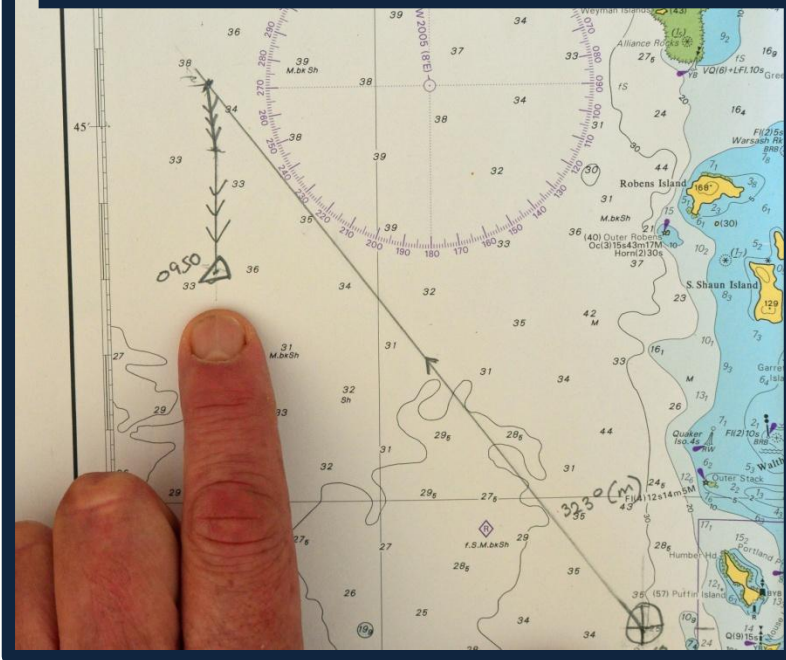
Then put 3 arrows on the line. This is the symbol for recording tidal streams and tidy up an excess line you have drawn



Now repeat this process and add the second hour of tide

You Have Now Plotted Your Position

Now draw a **TRIANGLE** over the point to mark your **ESTIMATED POSITION**. This is the symbol used for marking an EP. I always add the time of the EP as well to make it easy for me to see the time that I was at that point.

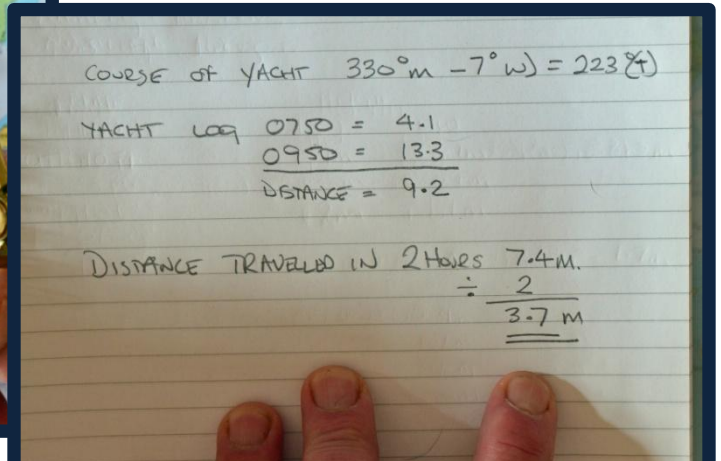
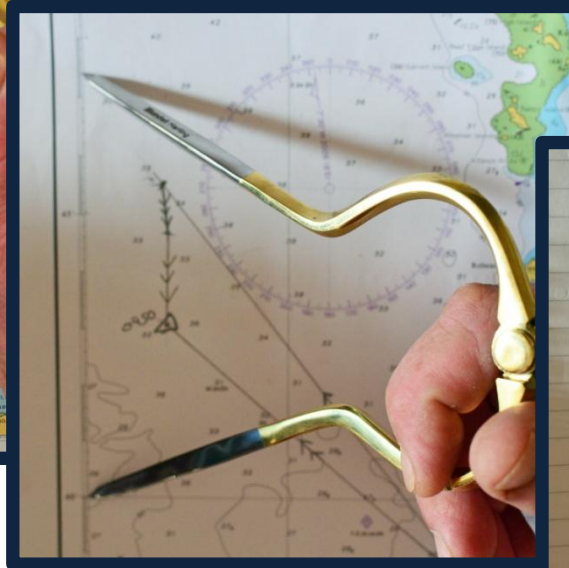
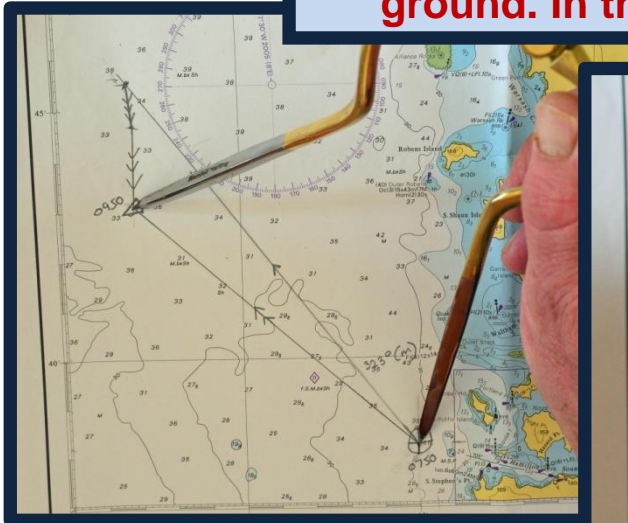


Finally, you can add a line from your position at **07.50** to your EP at **09.50**. Mark the line with **2 arrows** as this is the symbol used to record your ground track

Completing the Exercise

It is now a simple matter to find out how far you have actually travelled, stretch the dividers over your course and measure it off on the vertical scale

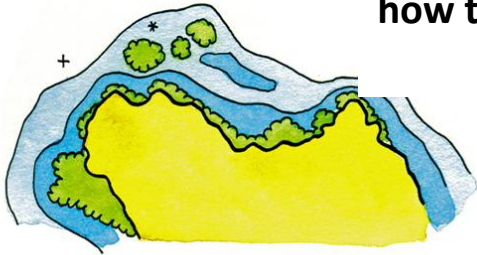
You can see you have travelled 7.4 miles in the past 2 hours, divide this number by 2 and you have your speed over the ground. In this case 3.7 knots.



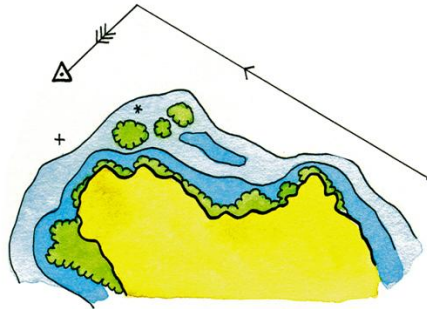
Therefore, due to the tidal stream your speed over the ground was lower than it was moving through the water

Projected EP

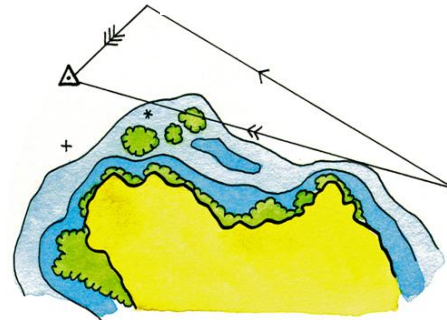
If you can predict your boat speed and how the tide will affect you...



...it's possible to work out a projected EP (an EP in advance)



...enabling you to see if the vessel is standing into danger



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Further Reading



We highly recommend Tim Bartlett's
RYA Navigation Handbook (G6)

You can buy a copy of this book by visiting our on-line shop

www.penguinsailing.com