BANANA WIND

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Navigation is the one science in which no margin whatever is left for the faker. - Felix Riesenberg

Basic Chartwork

You wouldn't want to attempt open ocean sailing using the information presented here. But if you just need some basic charting skills for limited coastal cruising and inland sailing, you might find these simplified instructions helpful.

Use this page in conjunction with Basic Navigation.

Necessary Tools

To simplify things, I suggest you obtain and use a Chart Protractor. This will eliminate the need for parallel ruler, and it makes plotting a course much easier.

You will also need a set of dividers. There are different types. Choose the one that feels most comfortable to you.

And lastly, you will need a chart for the area you wish to cruise.

There are two types of charts: mercator and gnomonic.

Mercator charts have parallel longitude and latitude lines, and they are used for coastal navigation.

Gnomonic charts have curved longitude and latitude lines, and they are used for long range navigation.

Basic Information

Charts depth shows mean low water (i.e. average lowest daily).

All charts designate how the depths are calculated.

Be aware that separate panels in a chart might be calibrated using a different standard.

Always double check the depth calibration in the panel and don't assume it will be the same as the general chart.

Chart Designations

Fathoms	43 = 4 fathoms, 3 feet
	03 = 0 fathoms, 3 feet
Meters	43 = 4.3 meters
	03 = 0.3 meters
Underlined number indicates drying time	4 = 4 ft. above water line at low tide

Plotting a course with no correction for current

1. Determine Variation.

Variation is the varying difference between true north and magnetic north. It changes over time. Locate the compass rose on the chart (or in the chart panel), and record the variation, year, and annual change. (e.g. variation 11 degrees 22 minutes W (1985) Annual

change 7 minutes W).

2. Determine Compass Error.

Subtract the variation year from the current year, and multiply the difference by the annual change. Add the result of the calculation to the chart variation to determine the compass error.

3. Record Compass Error.

Find the east and west compass error markings around the rotating disk on the chart protractor (Figure A). Place a pencil mark on the chart protractor to identify the compass error correction you calculated (Figure B). (Be sure to pay attention to whether the correction is East or West.) This pencil line will be the line you use to read your course headings or bearings, and you won't have to address variation again during your cruise if this is the only chart you will be using.

Figure A

Figure B

4. Mark the Course.

Using a pencil, draw a line on the chart for the course (or segment of a course) you wish to travel. Mark the line with two arrows (i.e. >>) as this will become your track line (i.e. the actual course over which your boat will travel).

5. Check Water Depths.

Check the water depth along the track line to determine that there is sufficient water depths for your boat. If there is insufficient depth anywhere along the line, consider altering the track line.

6. Align the Chart Protractor.

Lay the chart protractor along the track line. Be sure the chart protractor directional arrow points in the direction of travel.

7. Align the Chart Protractor Disk.

Rotate the protractor disk so it points north and the internal grid lines inside the disk align with a longitude or latitude line on the chart. (This may require repositioning the chart protractor along the track line.)

8. Determine the Course Heading.

Use the pencil mark on the compass error markings to read the course heading.

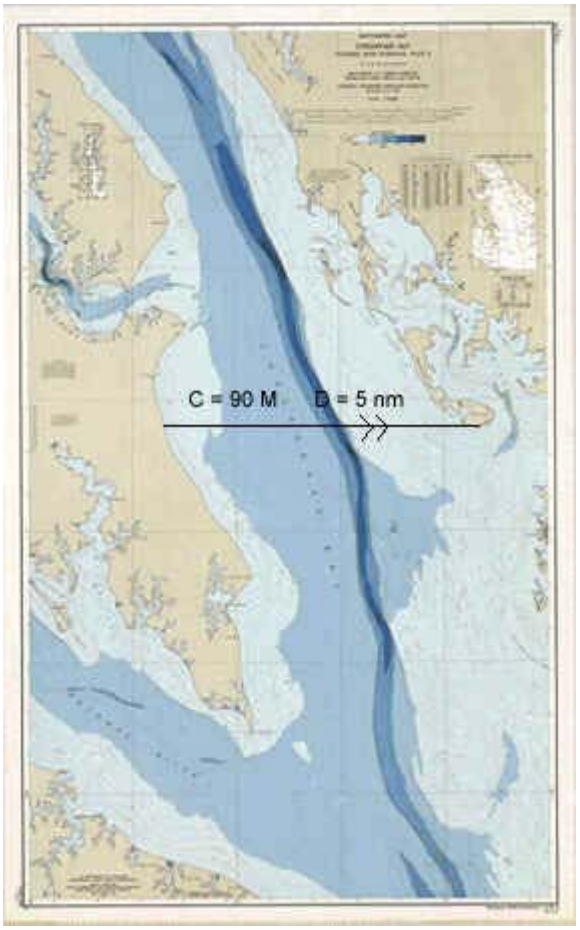
9. Record the Course Heading on the Chart.

Record the course heading along the track line. (If in a sailboat, see #13 below.) Place an M after the course heading (e.g. C = 90 degrees M). You have recorded the magnetic (M) course-to-steer. As long as you navigate using your compass, there are no further corrections needed. (Note: This makes the assumption that your compass does not need correction for deviation--see Basic Navigation.) The track line becomes the course-to-steer line because there are no adjustments necessary due to leeway or current.

10. Determine and Record Distance.

Measure the track/course line with the dividers, and use the latitude minute markings on the side of the chart to determine the distance. (Remember: 1 minute latitude = 1 nautical mile.) Record the distance on the

track/course line (e.g. D = 5 n.m.)



11. Leeway.

If in a sailboat, you must compensate for leeway (i.e. the sideways motion of the boat pushed by the wind as it makes headway.)

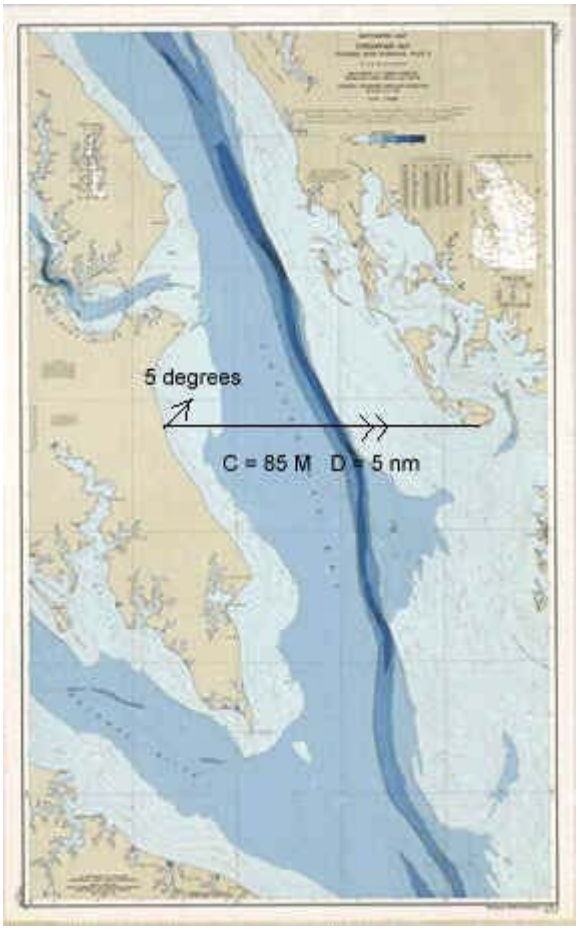
12. Determine Wind Direction and Leeway.

Determine the wind direction and how much leeway affects your boat. Most boats have 5 - 10 degrees leeway, and this can be affected by the amount of wind and the direction of travel in relation to the wind. You will have to make a determination for your own boat. (You can determine the leeway of the boat by using a handheld compass at the stern of the boat to site the track line left by the boat's wake. The difference in degrees between the track line and the compass course steered is the boat's leeway. It can be affected by increased winds, angle of the wind, and sea conditions.)

13. Record Corrected Course Heading.

Do not enter leeway as a vector in your chart plotting, but manually add or subtract it from your final course

heading calculation, and record the corrected course heading on the course line. An additional smaller vector arrow is added to the track line at the beginning point that indicates the recorded course heading has been corrected for leeway. You can record the degrees of leeway at the end of the small vector arrow. (E.g. if the wind is blowing out of the north, causing 5 degrees of leeway to the south, the corrected course-to-steer would be 85 degrees to compensate for the 5 degree of leeway.)



Plotting a course with a correction for current

1. Determine Variation.

Variation is the varying difference between true north and magnetic north. It changes over time. Locate the compass rose on the chart (or in the chart panel), and record the variation, year, and annual change. (e.g. variation 11 degrees 22 minutes W (1985) Annual change 7 minutes W).

2. Determine Compass Error.

Subtract the variation year from the current year, and multiply the difference by the annual change. Add the result of the calculation to the chart variation to determine the compass error.

3. Record Compass Error.

Find the east and west compass error markings around the rotating disk on the chart protractor (Figure A). Place a pencil mark on the chart protractor to identify the compass error correction you calculated (Figure B). (Be sure to pay attention to whether the correction is East or West.) This pencil line will be the line you use to read your course headings or bearings, and you won't have to address variation again during your cruise if this is the only chart you will be using.

Figure A

Figure B

4. Mark the Course.

Using a pencil, draw a line on the chart for the course (or segment of a course) you wish to travel. Mark the line with two arrows (i.e. >>) as this will become your track line (i.e. the actual course over which your boat will travel).

5. Check Water Depths.

Check the water depths along the track line to determine that there is sufficient water depth for your boat. If there is insufficient depth anywhere along the line, consider altering the track line.

6. Identify any Currents.

Identify the current from a current marking on the chart or from a cruising guide. Record its set (direction) and drift (speed in knots) (e.g. current = 0 degrees due north at 1 knot). Currents on charts will be identified with arrows; exact directional degrees will not be given. The current's speed in knots will be listed beside the arrow. (See Tides & Currents for determining set and drift of current while underway.)

7. Draw a Current Vector.

From the starting point on the track line, draw a current vector in the direction of the current. Length of the current vector should equal the number of minutes of latitude (as identified on the sides of the chart) that correspond to the speed of the current in knots (i.e. 1 degree latitude = 1 nautical mile of current). Use the dividers to determine the length of the current vector based on the latitude markings on the side of the chart. Mark the current vector on the chart with three arrows (i. e. >>>).

8. Draw the Course Line.

Draw a line from the end of the current vector to the destination point on the track line. This is your course-to-steer line, and it should be marked with one arrow (i.e. >).

9. Align the Chart Protractor.

Lay the chart protractor along the course line. Be sure the chart protractor directional arrow points in the direction of travel.

10. Align the Chart Protractor Disk.

Rotate the protractor disk so it points north and the internal grid lines inside the disk align with a longitude or latitude line on the chart. (This may require repositioning the chart protractor along the course line.)

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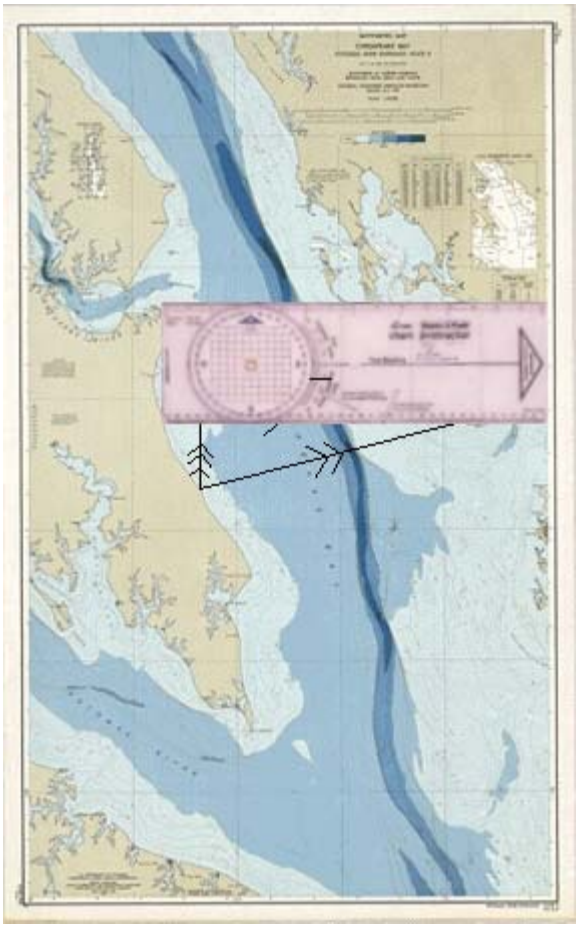


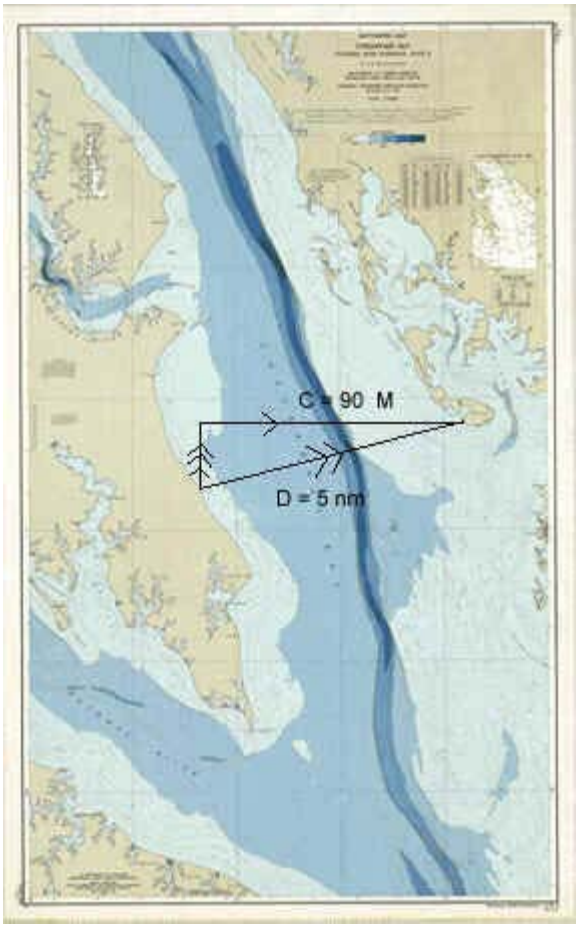
12. Record the Course-to-Steer.

Record your course-to-steer above the course line (e.g. C = 90 degrees M). This is the magnetic course you will steer to end up at your destination having accounted for the current. (Note: This makes the assumption that your compass does not need to be corrected for deviation--see **Basic Navigation**.)

13. Determine the Distance.

Measure the track line with the dividers, and use the latitude minute markings on the side of the chart to determine the distance. (Remember 1 minute latitude = 1 nautical mile). Record the distance on the track line (e.g. D = 5 n.m.). Use the distance and speed to

compute your anticipated time enroute.



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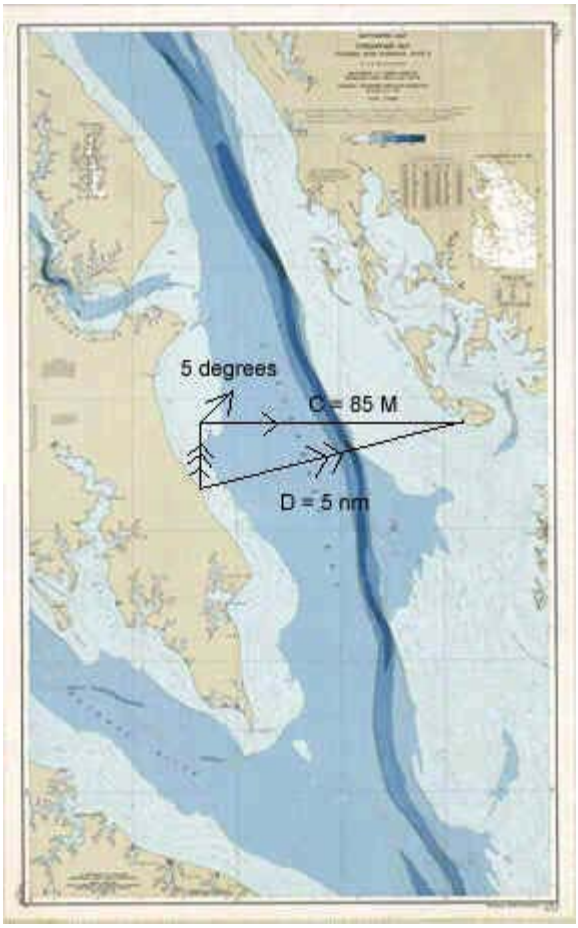

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