



## BCU Coastal Navigation and Tidal Planning Trainer Notes - April 2008

### Course Philosophy

This course is designed for those paddlers carrying out coastal journeys including islands up to 2 nautical miles offshore in areas of tidal movement up to 2 knots and winds of up to force 4 and is suitable for those seeking their 4 star award sea. This course is designed to complement the areas covered in the 4 star leader training.

### Course Aims

The aim of this course is to give the student the tools to enable them to plan and navigate effectively on coastal journeys in moderate sea conditions. This will include the following aspects:

- To interpret sources of information including maps, charts, coastal pilots and tide tables.
- To navigate on the water using visual references and simple pilotage techniques e.g. transits, dead reckoning and a compass.
- To be able to source, interpret and apply a weather forecast to the marine environment.
- By the end of the course each student should have planned at least 2 coastal journeys that they can take home as references for further trip planning.
- Students should also be aware of the range of resources they require to plan trips in the coastal environment.
- Although not part of the syllabus of the course, students should be made aware of the role of the Coastguard and the value of liaising with them.

### Equipment required for course by students ([pre-course letter info](#))

Prescribed map of a given area (for trip planning exercise) – could be included in course fee or directed by the tutor.

Silva type 4 or similar compass suitable for map work.

2b pencils & rubber

Notebook

Recommended Course book Navigation , Franco Ferrero

### **Equipment provided by tutor and required for effective Coastal journey planning**

It is expected that students will work in pairs and that the following equipment would be available between two.

Other types of compass.

Breton plotter

Parallel rules

Dividers

2B Pencils

Pilots / Sailing Directions / sea kayak guides e.g. Oilean.

Charts

Maps

Tide tables (Local relevant to pilot and charts)

### **Venue & Duration**

Suitable indoor teaching venue with work tables / chairs.

Access to Presentation resources for PowerPoint or OHP.

The course is of 8 hrs duration, (1day or several modules) at the end of the course students will receive a logbook entry and certificate as evidence of training completed.

Equivalence: Minimum similar NGB structured theoretical navigation course.

### **Staffing & Ratios**

Ratio 1:8     BCU level 4 A4 sea.

Ratio 2:12     As above + BCU level 3 sea kayak coach

(12 is seen as a working maximum on this course – due to course constraints re practical chart work exercises)

Trainer's note: Whilst this is a shore based course the intention is that it is highly practical and not a lectured syllabus. The students should participate in a variety of practical planning exercises using the variety of resources provided. This must constitute a minimum of 50% of the course time.

## Course content

### 1. Environmental considerations (Max time of 2 hours teaching)

#### Weather

*On completion of this module students should be able to source and apply a weather forecast to the area they are planning their trip planning exercise in.*

*This session should include practical exercises in interpreting weather information. See Appendix for examples*

- Cause and effect of atmospheric circulation. This should include:
  - Understanding of the development of weather systems and fronts.
- Cause and effect of weather systems including frontal development & effects. This should include from a synoptic chart;
  - Recognition of anti-cyclones and associated weather and wind conditions
  - Recognition of depressions and associated weather and wind conditions
  - Recognition of warm, cold and occluded fronts and their associated weather. It would be important to understand and be familiar with the use of a hand held or watch based barometer. The use of a barometer should also be tied into a barometric chart.
- Sea conditions associated with weather
  - Awareness of Beaufort scale and understanding of associated sea conditions.
  - Awareness of effect of systems offshore in the development of swell.
  - Awareness of the effect of reefs / shallows in the creation of breaks / boomers

- Awareness of the effect of cliffs, valleys etc. in creating wind shifts and funnelling effect.
- Awareness of katabatic winds (sea and land breezes)
- Awareness of causes and effect of fog.
- Where and when to obtain a sea area or inshore waters forecast and how interpret it.
  - Radio 4 LW times / RTE times.
  - Internet.
  - Local Radio information.
  - VHF via Maritime Coast Authority (MCA)
  - Awareness of terms used particularly with respect to time and change e.g. Imminent, soon, etc.
  - Importance of obtaining updates to forecasts due to changes.
- Working knowledge of the shipping forecast. This should include:
  - Terms used for movement of pressure systems.
  - Terms used for Pressure tendency in station reports
  - Terms used for Gale Warnings
  - Terms used for Timing of Gales
  - Terms used for Visibility
  - Terms used for Wind
  - Awareness of relevant sea areas including those which would provide information on following weather.
- Other sources of weather forecasts
  - Obtaining TV, Newspaper, local radio, mobile phone etc. forecasts and interpreting them to the coastal environment.

## Tides

On completion of this module students should be able to source and apply tidal information to the area they are planning their trip planning exercise in.

*This session should include practical exercises in interpreting tidal information. See Appendix for examples*

- The basic cause and effect of tidal movement on a daily and monthly basis.
  - Effect of gravitational pull of moon
  - Reason why tide is approx 1 hour later each day

- Cause of springs and neaps tides
  - Effect of the above on the range of the tide.
  - Effect of the above on tidal streams rates.
  - Understanding of how this relates to trip planning regarding timings, sea conditions, launching and landing.
- The cause and effect of tidal movement on an annual basis.
    - Effect of equinoxes due to elliptical orbit of earth
    - Effect of elliptical orbit of moon (Apogee & Perigee)
  - Where to obtain tidal information including range.
    - Tide tables and almanacs including awareness that they may provide info on heights or range.
    - The ability to recognise springs / neaps from tide tables
    - [www.ukho.gov.uk](http://www.ukho.gov.uk)
    - Local papers etc.
  - The rule of constants, 12ths, 3rds.
    - Awareness of primary and secondary ports (constants)
    - Understanding the rule of 12ths in relation to volume of water especially with respect to timings for launching / landing and the effect on reefs in forming boomers.
    - Understanding the rule of 3rds rule in relation to tidal stream rates especially with respect to journey times, crux points and sea conditions.
    - Awareness of limitations to these rules especially where tides are constricted by land. E.g. The Solent, Corryvreckan, Strangford Narrows, Menai Straits.
  - The effect of wind and land features on tidal movement.
    - Effect of wind with and against tide.
    - Effect of headlands and constrictions in creating tide races
    - Effect of headlands, bays etc in the formation of eddies
    - Effect of underwater topography on creating overfalls
    - Awareness of rip currents in surf environment
  - The awareness and understanding of tidal anomalies.
    - Examples of where the tide stream bears little or no relation to local high water.
    - Examples of where tidal streams flow for different time periods e.g. 9 hours on flood and 3 on ebb or where it always flows in one direction due to eddies.

## 2. Sources of information

### OS Maps & Charts

On completion of this module students should be able to plan a coastal trip on both an OS map and a chart recognising the limitations of the OS map

- The understanding and application of Latitude and Longitude and grid references.
  - Understanding that Latitude and Longitude relate to degrees in a circle.
  - Awareness of Parallels of latitude and Meridians of Longitude
  - How to take a Latitude and Longitude from the chart
  - How to take a 6 figure grid reference from a map.
- The understanding and application of scale and measurement using Nautical miles, land miles as well as kilometres.
  - Awareness of the fact that 1 minute of Latitude = 1 nautical mile and = 1.8km (approx 2km).
  - Awareness of the value of working in nautical miles on the sea – as tidal information is given in knots.
  - Understanding of what scale is
  - Awareness of range of scales for charts
  - How to take a measurement using dividers on the chart
  - Where to find the Latitudinal scale on an OS map
- How to take a true and magnetic bearing from OS maps and charts.
  - Understanding the importance of being aware of general direction prior to taking a bearing
  - Taking a grid bearing from an OS map using grid lines and hand held compass.
  - Taking a true bearing from a chart using Breton plotter and/or parallel rules
  - Being aware of magnetic variation and
    - adding as required from map to ground
    - subtracting as required from ground to map
  - Understanding risks of metallic interference causing deviation of a bearing.

- How to interpret the variety of information on OS maps and charts.
  - Being aware of key information on a chart
    - Lights flashing sequence and colour
    - Buoyage including cardinal and lateral marks
    - Flood & ebb tides
    - Eddies and overfalls
    - Tidal diamonds
    - Leading lights and transits
    - Shipping lanes
    - Heights / depths
  - Being aware of key information on an OS map
    - Beaches
    - Telephones
    - Access / egress
    - Micro navigation feature such as rocky islands, indentations, obvious small bays etc
  
- The advantages and disadvantages of OS maps and charts.
  - Costs
  - Scale issues
  - Appropriate marine information available on each
  - Awareness of the value of “creating” a working map by transferring the chart information on an OS map before laminating. Students should see examples of this.

#### Pilots (Admiralty and Sailing Directions)

On completion of this module students should be able to extrapolate information from the pilot in order to plan a coastal trip on both a chart and OS map recognising the limitations of the OS map

- The sourcing, understanding and application of information from the coastal pilot.
  - How to find and use tidal stream information
  - How to apply information on shallows / reefs with respect to breaks / boomers
  - The value of transferring the pilot information on an OS map before laminating.

### Other Sources Information

- The value of information from local sources including sea kayak guides, local clubs and mariners.
- Tidal diamonds
- Tidal stream atlas

Students should see some examples of these.

### 3. Coastal planning

#### Trip planning

- The various factors to take into account when planning a trip including calculation of timings, group skill level, logistics, environmental factors.
- How to calculate Estimated Time of Departure (ETD) and Estimated Time of Arrival (ETA)
  - Awareness of Crux points in terms of tidal streams.
  - Awareness of escape points and routes
  - Awareness of estimated group speed / ability
  - Importance of shore contact and role of MCA
- How to create and use a tidal planning table
  - See example in Appendix
- How to create and use a pictorial image of the relevant tidal movements.
  - See example in Appendix

#### The application of navigation theory

- How to calculate bearings for short crossings of tidal waters.
- How to apply timing calculations on the water
- To be aware of time made good when utilising tidal flow
- How to relate map/chart information to the coastal environment
- How to use a natural transits, dead reckoning and estimated positioning.
- Application of Rules of the Road