

Coastal Navigation and Tidal Planning

Trainer Notes

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 is a prerequisite for those seeking their British Canoeing Sea Kayak Leader Award. However, anyone wishing to undertake journeys on the sea using a kayak would find the technical and theoretical aspects not only useful, but essential for safe travel in the marine environment! This course is designed to complement the areas covered in the British Canoeing Sea Kayak 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 and dead reckoning;
- effective use of a compass;
- to be able to source, interpret and apply weather information to the coastal 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;
- to be aware of the range of resources required to plan trips in the coastal environment;
- students should be made aware of the role of the Coastguard and the value of liaising with them.

Equipment required by students

Course providers are to advise students what they are expected to bring in the pre-course information. Either the course provider or student will need to supply the following:

- prescribed map of a given area (for trip planning exercise);
- Silva type 4 or similar compass suitable for map work;
- 2B pencils, rubber and notebook;
- recommended course book - Sea Kayak Navigation, Franco Ferrero (2nd Edition, 2007).

Equipment provided by tutor and required for 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;
- chart work instruments, e.g. Breton plotter, Parallel rules and Douglas protractor;
- dividers;
- 2B pencils;
- extracts from Pilots/Sailing Directions/Sea Kayak Guides, e.g. Oileain;
- charts and maps in full, as well as laminated parts and a range of examples, e.g. Imray, Admiralty, portfolio, small craft and electronic;
- tide tables (local, and relevant to pilot and charts);
- tidal stream atlas.

Venue and duration

The course is a minimum of 8 hours' duration (1 day or several modules).

Whilst this is a classroom-based course, the intention is that it is highly practical and not a lectured syllabus. The students must participate in a variety of practical planning exercises using the resources provided. This will constitute a minimum of 50% of the

course time. A suitable indoor teaching venue with worktables and chairs is required, along with ample work space and access to presentation resources, e.g. PowerPoint.

Administration

- a course authorisation number is required - obtained from your National Association Delivery Centre;
- Immediately after the course, the course director is required to complete the **Course Results process** and pay the required **fees** to their National Association Delivery Centre. Once the results are returned, they will be validated and, where appropriate, authorised for certification.
- Course directors need to ensure they are fully aware of the end of course process, fees and required timescales;
- Please check with your National Association Delivery Centre for relevant fees.

Provider requirements

British Canoeing Coastal Navigation and Tidal Planning Provider.

Note regarding RYA equivalents

Where either the British Canoeing Coastal Navigation and Tidal Planning, or British Canoeing Open Water Navigation and Tidal Planning course is required by British Canoeing as a prerequisite for other Awards or Qualifications, a number of RYA qualifications are also considered appropriate. These are detailed in “Alternative Qualifications for Navigation and Tidal Planning” Courses (attached at the back of these notes). Where candidates wish to use an appropriate equivalent, they are required to present their certificate to the course director and their National Association Delivery Centre when they register for the award. This is applicable in the main to Sea Kayak and Advanced Sea Kayak Leader Training and Assessment.

Course content

Students attend with varying knowledge and experience and this should be ascertained at the beginning of the course. The course will then be delivered accordingly to ensure learning outcomes are achieved.

The course information will fall into three main areas and the key aspects covered under each of these are highlighted below:

1. Environmental considerations (typically 25% of course time)

Weather:

Learning outcome - students should be able to source, comprehend and apply weather information to coastal trip planning.

This session must include practical exercises in interpreting weather information:

- the cause and effect of atmospheric circulation, weather systems and fronts;
- the interpretation of a synoptic chart – this should include:
 - 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 and wind conditions;
- recognition of isobars and the awareness of the impact of pressure gradient:
 - it is also important to understand the value of, and be familiar with, the use of a barometer;
- sea conditions associated with weather, and the Beaufort Scale – this should include an:
 - awareness of the Beaufort scale, mindful of the sea conditions likely to be experienced;

- awareness of the effect of an offshore weather system and associated fetch in the development of swell;
- awareness of the effect bathymetry, e.g. the effect of reefs in the creation of surf and/or boomers;
- awareness of the effect of cliffs, valleys, etc. in creating wind shifts and funnelling effect;
- awareness of sea and land breezes, anabatic and katabatic winds;
- awareness of causes and effect of fog;
- awareness of rip currents in surf environment;
- obtaining and interpreting a sea area forecast – this should include where and when to obtain a sea area or coastal waters forecast and how to interpret:
 - radio 4 LW forecast times / RTE forecast times;
 - internet forecasts;
 - local radio information;
 - VHF Maritime Safety Information via Maritime and Coastguard Agency (MCA)
 - an awareness of the terms used particularly with respect to time of change, e.g. imminent, soon, etc.;
 - the importance of obtaining updates to forecasts;
 - working knowledge of the shipping forecast, this should include knowledge of the terms used for:
 - movement of pressure systems;
 - pressure tendency in station reports;
 - gale warnings;
 - timing of gales;
 - visibility;
 - wind;
 - an awareness of the relevant sea areas, including those which would provide information on the weather to follow;

- other sources of weather forecasts - this should include obtaining forecasts from television, newspaper, mobile phone, etc. and interpreting them to the coastal environment;
- a combination of effects to create extreme tidal ranges (known as proxigean tides).

Tides:

Learning outcome – students should be able to source and apply tidal information to coastal trip planning.

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

- the basic cause and effect of tidal movement on a daily, monthly and annual basis, including:
 - the effect of gravitational pull of the sun and the moon;
 - the reason why the tide cycle is approximately 1 hour later each day;
 - the cause and effects of spring and neap tides, including the range of the tide and tidal streams rates;
 - an understanding of how tidal movement relates to trip planning regarding timings, sea conditions, launching and landing;
 - the effect of equinoctial periods;
 - the effect of elliptical orbit of the moon (Apogee and Perigee).
- the cause and effect of changes in air pressure on tidal range;
- sources of tidal information, including:
 - tide tables and almanacs, including awareness that they may provide information on heights or range and recognition of springs and neaps;
 - www.ukho.gov.uk;
 - local papers, etc.
- the effect of wind and land features on tidal movement, including:
 - the effect of wind, with and against tide;
 - the effect of headlands and constrictions in creating tide races;
 - the effect of headlands, bays, etc. in the formation of eddies;

- the effect of bathymetry on creating over-falls;
- how to estimate tidal behaviour, including:
 - primary and secondary ports (constants);
 - how to apply 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;
 - how to apply the rule of 3rds and the 50/90 rule in relation to tidal stream rates, especially with respect to journey times, tidal gates and sea conditions;
 - an awareness of limitations to these rules, especially where tides are constricted by land; for example, the Solent, Corryvreckan, Strangford Narrows and the Menai Straits;
 - examples of where the tide stream bears little or no relation to local high water;
- the importance of being aware of tidal anomalies, including:
 - 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.

2. Sources of Information (typically 25% of course time)

Learning outcome - students should be able to extract information embedded in maps, charts, pilots and other sources of information.

OS Maps and Charts

- the understanding of systems to fix position, including:
 - understanding that Latitude and Longitude relate to degrees in a circle;
 - an awareness of Parallels of Latitude and Meridians of Longitude;
 - how to take a Latitude and Longitude position from a chart;
 - how to take a 6-figure grid reference from a map;

- the understanding and application of scale and distance, including:
 - an awareness of the fact that 1 minute of Latitude = 1 nautical mile and = 1.8km
 - an awareness of the value of working in nautical miles on the sea – as tidal information is given in knots;
 - an understanding of what scale is;
 - an awareness of the variation in range of scales on charts
 - how to take a measurement using dividers on the chart
 - where to find the Longitudinal and Latitudinal scales on an OS map;
- how to take a true and magnetic bearing from OS maps and charts, including:
 - an understanding of the importance of being aware of general direction prior to taking a bearing;
 - taking a grid bearing from an OS map using gridlines and handheld compass;
 - taking a true bearing from a chart using a plotter;
 - an awareness of magnetic variation;
 - understanding the risks of metallic interference causing the deviation of a bearing;
 - how to interpret the variety of information on OS maps and charts, including:
 - being aware of key information on a chart;
 - lights - flashing sequence and colour;
 - buoyage, including cardinal and lateral marks;
 - flood and ebb tides;
 - eddies and over-falls;
 - 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 features such as rocky islands, indentations, obvious small bays, etc.;
- the advantages and disadvantages of OS maps and charts, including:
 - costs;
 - scale issues;
 - appropriate marine information available on each;
 - awareness of the value of “creating” a working map by transferring the chart information onto an OS map before laminating (students should see examples of this).

Pilots and tidal stream atlas (Admiralty and Sailing Directions):

- sourcing, understanding and applying information from the pilot and tidal stream atlas, including:
 - how to find and use tidal stream information;
 - how to apply information on shallows/reefs with respect to breaks/boomers;
 - transferring relevant pilot information onto an OS map.

Other sources of information:

The value and limitations of information from local sources including sea kayak guides, local clubs and water users.

3. Coastal Planning (typically 50% of course time)

Learning outcome; students should be able to extract information from a range of nautical publications in order to plan coastal trips on both a chart and OS map, recognising the limitations of the OS map.

Trip planning:

The importance of taking an overview from a number of perspectives prior to detailed planning, including:

- calculation of timings, group skill level, logistics, and environmental factors;
- how to calculate Estimated Time of Departure (ETD) and Estimated Time of Arrival (ETA), including:
 - tidal gates in terms of tidal streams to maximum advantage;
 - escape points and routes;
 - estimated group speed/ability (students should see a number of examples);
- the importance of shore contact and the role of the MCA;
- how to use a tidal planning table;
- how to create a pictorial image of the relevant tidal movements.

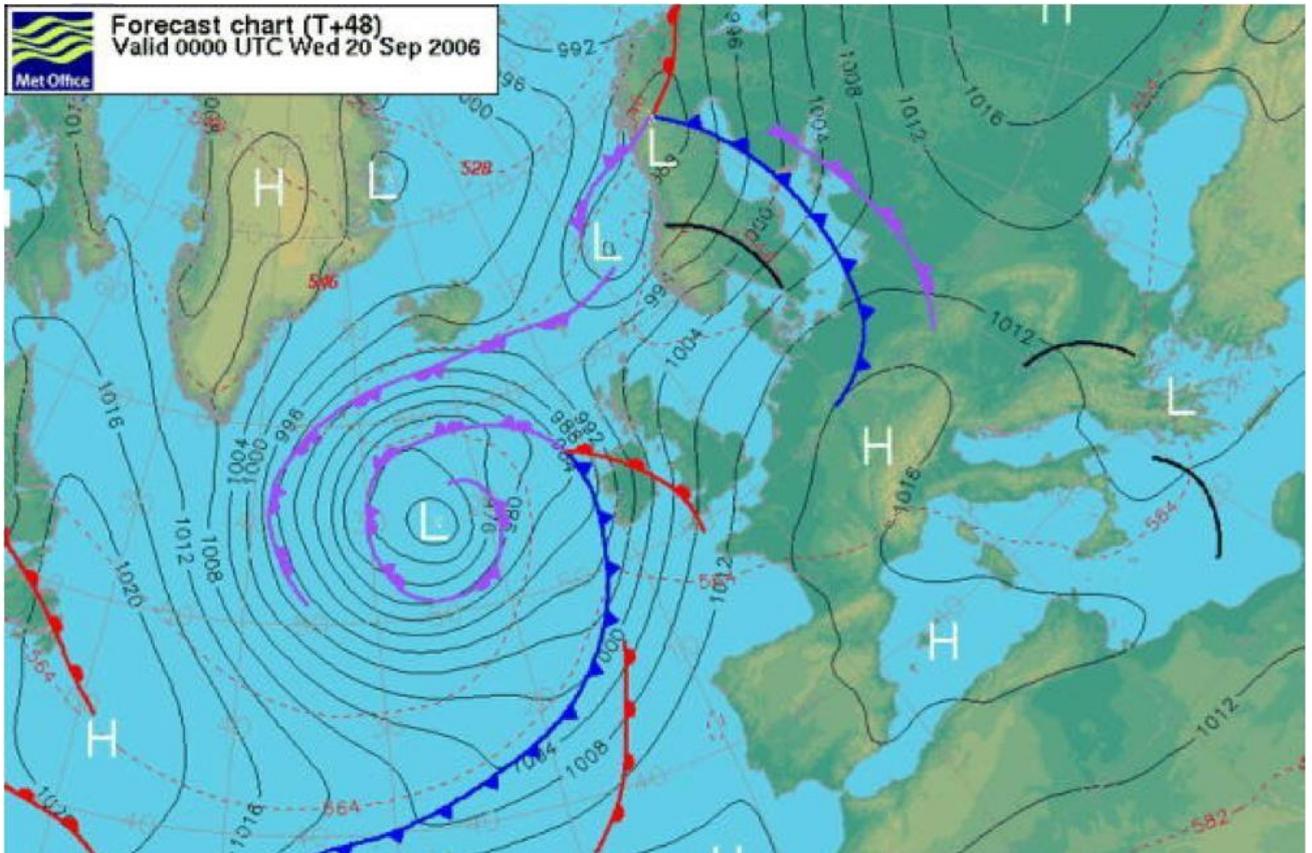
The application of navigation theory:

- how to calculate bearings for short crossings of tidal waters (2 nautical miles);
- how to apply timing calculations on the water;
- how to be aware of time made good when utilising tidal flow;
- how to relate map/chart information to the coastal environment;
- how to use natural transits, dead reckoning and estimated positioning;
- application of the Rules of the Road.

Appendices

1. Exercise 1 – Interpreting Weather
2. Exercise 2 – Tidal Planning
3. Exercise 3 – Chart Work
4. Sample Trip Planner
5. Rules of the Road and Coastguard Information
6. Sample Pre-course letter

Exercise 1 – Interpreting Weather



Interpret the above chart to predict the weather on Wednesday, 20th and Thursday, 21st September.

Exercise 2 – Tidal Planning

Fill in the blanks:

Port	Constant	Date	Time of HW1	Time of LW1	Time of HW2	Time of LW2	Springs or Neaps
Francoville	+0152	2nd January					
Brown Bay	+0020	31st March					
McClure's Point	-0433	27th April					
Robinson's Cove	-0253	12th May					
Hallissey Island	-0600	10th June					
Port Jeffs	-0524	22nd July					
Stamp Reef	+0056	29th August					
Dennis Harbour	-0044	15th September					
Trys Lough	-0529	2nd October					
Devlin Hole	+0010	21st November					

Exercise 3 - Chart Work

Pick 2 points on the chart and work out the Latitude/Longitude, distance and bearing:
From Point 1 to Point 2

From Point 1			To Point 2				
Latitude	Longitude	Name	Latitude	Longitude	Name	Distance	Magnetic Bearing

Sample trip planner

This can be added to map prior to lamination or laminated onto white card as a deck slate:

HW DOVER:	1. 2.	LOCAL HW:	1. 2.
FLOOD TIDE STARTS:		1. 2.	
EBB TIDE STARTS:		1. 2.	
NOTES:			

Sample trip planner

JOURNEY PLANNER		
HW DOVER	USEFUL VHF CHANNELS	SHORE CONTACT NO.
LOCAL HW		
TIDAL GATE 1 Location	Time of flood 1	Time of ebb 1
	Time of flood 2	Time of ebb 2
	Direction	Direction
	Rate	Rate
TIDAL GATE 2 Location	Time of flood 1	Time of ebb 1
	Time of flood 2	Time of ebb 2
	Direction	Direction
	Rate	Rate
TIDAL GATE 3 Location	Time of flood 1	Time of ebb 1
	Time of flood 2	Time of ebb 2
	Direction	Direction
	Rate	Rate
WEATHER FORECAST:		

NOTES:

Rules of the Road

- Give way to vessels restricted by their draft;
- Give way to vessels in channels – seek shelter by buoys during periods of indecision!
- Cross at right angle to direction of shipping channels;
- If crossing or entering busy harbours, register intention with harbour master/authority on VHF or by mobile;
- In open water, power and/or overtaking boat must give way but carry white collision flare if regularly paddling in busy shipping/harbour areas as kayakers can be hard to see!
- Vessels should aim to pass each other port to port;
- Reflective strips should be on boats and paddles;
- Awareness of simple collision regulations to include sound and signals.

Coastguard

- Can be contacted on VHF on channel 16 or by mobile phone – it is useful to store the Coastguard number in your phone;
- Coastguard will require ETD and ETA, the number in group, colour of boats, safety equipment carried, your call sign (VHF) and contact telephone number;

- If late back, Coastguard will not activate a search unless they are contacted by your shore contact or member of the public who noticed your car on the slipway!
- You can register your boat and call sign with the Coastguard via the CG66 registration scheme;
- You should write your name, address and contact number on your boat in the event of it being lost at sea;
- By contacting the Coastguard you become their eyes on the water, providing them with a second opinion in the event of a suspected incident in the area you are in.

Sample Pre-course letter

Dear

Thank you for enrolling on the British Canoeing Coastal Navigation and Tidal Planning theory course. Please find enclosed a copy of the syllabus for the course and a timetable for the training.

As this course has been designed with the coastal paddler in mind, it is anticipated that those attending would have some experience of sea kayaking in a simple coastal environment. Three day trips at British Canoeing 3 Star Sea/Sea Kayak Award standard under suitable leadership is an appropriate minimum level of experience.

As navigation is a practical activity which relies heavily on a set of tools, at least 50% of this course will be practical; therefore you should invest in the following personal items that are fundamental to navigation planning:

- Prescribed map of a given area (for trip planning exercise) could be included in the course fee or directed by the tutor;
- Silva type 4 or similar compass suitable for map work;
- 2b pencils and eraser;
- Notebook.

At the end of the course you will have completed a number of take home trip planning exercises that will be useful as examples for future exercises. At least one exercise will include using the specified map.

Immediately after the course, the trainer is required to complete the **Course Results process** and pay the required **fees** to their National Association Delivery Centre. Once the results are returned, they will be validated and, where appropriate, authorised for certification.

Course directors need to ensure they are fully aware of the end of course process, fees and required timescales.