

Appendix B: Course Planning

1. Introduction

1.1 Purpose

- 1.1.1 This Appendix provides guidance to planners, and defines the levels of technical difficulty which are used to specify course standards. It includes advice on best practice that was previously incorporated in the Rules.
- 1.1.2 The key planning objective can be seen as producing enjoyable courses that meet the defined requirements for a given event.
- 1.1.3 This Appendix cannot replace training and previous experience. All planners are encouraged to read relevant literature (such as the BOF Course Planning Handbook) and to attend training courses.

2. Planning Courses

2.1 Technical Difficulty

- 2.1.1 The technical difficulty of a course is based on the skills needed to successfully complete it. The aim of Planners should be that the courses at an event show clearly the progression of technical difficulty, with each course providing the correct level of technical and physical challenge. The specification of each level of technical difficulty is included in section 4.
- 2.1.2 A course of a specified technical difficulty should satisfy the criteria in each of the areas shown in this Appendix.
- 2.1.3 The technical difficulty of a course is that of its hardest component. For example, a course is of technical difficulty 3 even if it has just one element at that difficulty, even though the rest may be easier. However, a well-designed course of technical difficulty 3 will have most, if not all, of its elements at that difficulty.
- 2.1.4 It is recognised that many orienteering areas in Great Britain do not allow courses of the higher technical difficulties to be planned on them. In order to allow events to take place whilst still adhering to the Guidelines a compromise has therefore to be accepted. In such areas Planners must plan at the correct level as far as the terrain allows. For example, if the area only allows courses with a technical difficulty up to 4 to be planned, then those courses requiring technical difficulty 1, 2, 3 and 4 can be planned exactly to the Guidelines. Those courses specified as requiring technical difficulty 5 should then be planned at technical difficulty 4, accepting the fact that they will be less than ideal but the best that the terrain will allow.

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2.2 Physical Difficulty

- 2.2.1 The nature of the terrain over which the competitors will be running should be considered for all age groups. Areas of dense undergrowth (e.g. rhododendrons) or which are difficult underfoot (e.g. boulder fields), do not test the orienteering skills of 'running navigation' and so should be avoided. Steep descents, whilst acceptable for M/W21, should be kept to a minimum for juniors and seniors. Features such as fences which may provide significant obstacles for younger competitors or less agile age groups should be taken into account.
- 2.2.2 All courses should avoid offering route choices that may tempt competitors into physical danger.

2.3 Planning for Juniors

- 2.3.1 Competitors in the very junior age categories need every encouragement to enjoy the sport, and the feeling of failure engendered by a lengthy spell lost in the forest is a major disincentive to younger competitors. Children are attempting a sport that provides a considerable mental challenge, and the need for courses to match their abilities cannot be over-stressed. Even at large events, designed to find a true champion as the winner, it must be remembered that junior competitors are far more erratic in their performance than seniors. Simple and short courses planned to the correct technical standards are the only way to produce an evenly grouped results list whilst still finding the true champion.
- 2.3.2 Planning the Junior courses is the most difficult task in terms of providing courses of just the right technical and physical level. They should always be taken into account when locating the start and finish of the event to ensure that these courses can be taken through suitable terrain.

2.4 Planning for Seniors

- 2.4.1 Older orienteers are technically just as capable as the M/W21 competitors. It is therefore totally inappropriate to combine their courses with the technically easier Junior courses just because the recommended course lengths are similar, unless the terrain prevents courses of high technical difficulty being set.

2.5 Deciding how long the courses should be

- 2.5.1 For events at level 3 (e.g. badge events) and above, the required lengths of courses are defined in terms of competitors' times. In general, the most reliable approach is:
- i) decide on an appropriate length for one course (usually M21L or M21E) as a base
 - ii) use the course length ratios and recommended class combinations given in the appropriate event guideline to calculate the required lengths of all the other courses. (The course length ratios have been calculated from the results of a large number of events over several years.)

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2.5.2 Various methods for deciding on the length of the base course are available; all have their pitfalls. The main methods are:

i) Comparison with previous events. Often the most reliable method - most British areas have already been used for orienteering; even new areas usually have similar terrain locally with which they can be compared. Points to watch:

- was the entry representative, or were all the good runners elsewhere?
- runnability changes as vegetation matures
- undergrowth has more effect in the summer/autumn
- was the planning for the previous event unusual in e.g. the amount of climb or track running required? If the problem is climb, calculate a 'corrected' (i.e. flat equivalent) length by adding 1 km to the length for every 100 m of climb – and remember to take it back off again when you plan your own courses.

ii) Test running – planning a course and then running it. This is often difficult to interpret, as

- navigating to a feature is generally much easier in an event, when there is a flag on it
- running solo tends to be slower than running competitively.

2.5.3 Applying the course length ratios – points to watch for:

- M21 probably uses the whole area. The shorter courses use only part of it, and this might be more or less runnable, or steeper/flatter, than the average
- rough terrain has a greater effect on the running speed of younger and older competitors than of M21s
- older competitors are significantly affected by steep terrain, particularly downhill
- older competitors find dense tree growth more of an obstacle – suppleness decreases with age

There is no magic formula for allowing for these variables.

2.5.4 Do **not** try to adjust the course length to cater for the expected quality of the competitors, e.g. by making a particular course longer because you know that some top orienteers will be entering. Similarly, if the running times on a particular course turn out to be longer than intended simply because the quality of the entry was low, this does not mean that the course was planned too long!

2.5.5 For colour coded events, the required lengths of courses are as given in Guideline A. Whilst it is possible to go through the above exercise for choosing course lengths

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based on M21L, it is usually sufficient simply to plan within the range of normal lengths given in the guideline.

3. Planning and the Map

3.1 Overprinting and Course Drawing

3.1.1 Rule 5.2.1 applies: course markings on the map are to be as laid down in the 'International Specification for Orienteering Maps 2000', section 4.7 (booklet available from BOF Office or to download from the IOF website at <http://www.orienteering.org> (go to "Publications : Rules and Guidelines").

3.1.2 The courses and map corrections should be overprinted in transparent PMS purple (red/violet) colour. All line thicknesses should be 0.35mm.

3.1.3 The starting point of the course shall be marked by an equilateral triangle of side 7mm which points towards the first control. The centre of the triangle shows the precise position of the start point.

3.1.4 The site of each control shall be shown as the centre of a circle of 6mm diameter. The circle should be broken to avoid obscuring important detail. There should not be a dot marking the central point.

If the control feature is shown on the map symbolically rather than to scale, the circle should be drawn so that the symbol lies exactly at the centre. For example, this means that if you use the east side of a dot knoll as a control site then the circle should be drawn around the middle of the symbol, not the east side of it.

3.1.5 The position of the finish shall be shown as the centre of two concentric circles of diameter 5mm and 7mm. Where a course uses two or more maps with map exchanges then the finish should be shown on all maps.

3.1.6 If the controls are to be visited in a prescribed order they shall be numbered in that sequence. The numbers shall be printed on a north-south axis, with the top north, and should be positioned so that they do not obscure any important detail. 4.5mm Arial Bold (18pt) is the preferred font.

Control numbers should be positioned so as to obscure as little map detail as possible but close enough to the circle as to avoid ambiguity.

3.1.7 If the controls are to be visited in a prescribed order they shall be joined by straight lines. These lines should be broken to avoid obscuring important detail, diverted to meet up with compulsory routes, broken or diverted to indicate compulsory crossing points, and broken or diverted to avoid lakes, 'out of bounds', or other areas that cannot be crossed by competitors.

3.1.8 Any part of the course where the competitor is obliged to follow a compulsory route shall be clearly and precisely indicated on the map by a dashed line.

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- 3.1.9 Forbidden routes (e.g. busy roads, railways) shall be shown by a chain of crosses.
- 3.1.10 Uncrossable boundaries (ones which it is forbidden to cross) can be indicated by overprinting the mapped feature with a solid line.
- 3.1.11 Crossing points shall be indicated by curved brackets.
- 3.1.12 The dimensions of the course overprint symbols on 1:10,000 (or larger scale) maps should be as defined in 3.1.3, 3.1.4, and 3.1.5. However, for competitions in which both 1:10 000 and 1:15 000 maps are used, the size of the symbols on the 1:10 000 maps may be 150% greater than on the 1:15 000 maps. Factors to consider :
- Symbol enlargement allows the control descriptions to be the same on the 1:15,000 and 1:10,000 maps if both are used at the same event.
 - Some courses, such as White, and some types of event, such as Sprint races, may have controls relatively close together. Enlarged circles might overlap to an unacceptable degree.
 - Hand overprinters generally do not offer the option of enlarged symbols.
- 3.1.13 Editing, which will also include the breaking of control circles and connection lines, should be an important part of the process of preparing the overprints. Time should be allowed for this in the planning timetable. It is important that competitors should be able to identify their courses.
- 3.1.14 If pre-marked maps are not printed on waterproof material they should be protected by a sealed plastic covering of at least 250 gauge (or a heavier gauge if the map unit size exceeds A4) prior to issue to competitors.

3.2 Map Corrections

- 3.2.1 If corrections have to be made to the map, an adequate number of maps detailing the 'map corrections' shall be made available.
- 3.2.2 Map corrections shall be shown in a colour contrasting with the rest of the map, and shall include a written indication of the type of correction. The total number of corrections shall be stated, and the corrections serially numbered.
- 3.2.3 Competitors shall have the opportunity to receive their maps, and make any necessary corrections to them, at least 30 minutes before their start times.
- 3.2.4 If pre-marked maps are used, copies of the map showing no information other than any map corrections essential to the competition should be displayed and available for study before the start line.

3.3 Master Maps

- 3.3.1 Rule 5.4 applies.

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- 3.3.2 If the master maps are displayed in the open, both the master maps and the area in which they are copied should be adequately protected from the weather.
- 3.3.3 Each master map should be mounted on a board or other firm surface large enough to provide a base for the competitor's map.
- 3.3.4 The number of master maps provided should be sufficient to cope with the likely number of competitors copying them at any one time.
- 3.3.5 Master maps for different courses should be clearly distinguishable by approaching competitors.

3.4 The Start

- 3.4.1 The position of the centre of the start triangle shown on the map shall be on a mapped feature and identified on the ground by a control banner. For TD1 and 2 courses this feature will need to be a path or similar feature; also it should not be at a junction, as this would require the beginners to decide which way to go without knowing where they have just come from.

Where a map exchange or a 2nd set of master maps are used the position of the start of the next section of the course shall be marked on the ground by a control banner if it is a significant distance away from the previous control site.

- 3.4.2 The position of the start and the map issue point or master maps should be such that competitors waiting to start cannot see the route taken by competitors who have started.
- 3.4.3 The courses should be designed so that competitors are unlikely to return past the timed start on their way to the first control site.

3.5 Control Site Layout

- 3.5.1 The control banner should be visible from all directions of approach unless the control description indicates otherwise. Control banners should be sited so that the absence or presence of another competitor does not affect the difficulty of locating the control.
- 3.5.2 Sufficient marking devices should be clearly visible and easily accessible from the control banner.
- 3.5.3 Marking devices should be positioned in such a way that competitors may endorse a control card attached to any reasonable part of their clothing.
- 3.5.4 At competitions of Level 2 and above, the layout of the control banner, control code and marking devices should be the same for all controls. A model control should be displayed at the pre-start.

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3.6 Measurement of Distance and Height Climb

- 3.6.1 Course length is measured as defined in rule 6.1.2, and quoted to ± 0.1 km (e.g. 5.5km, not 5.50km). This is the shortest route which a competitor could possibly take, irrespective of whether or not the competitor would be sensible to do so.
- 3.6.2 Height climb is measured as defined in rule 6.1.3, and quoted to ± 5 m. That is, it is measured "along the shortest sensible route", which may well be longer than the route used for measuring the course length. This is not necessarily the "optimum route", nor is it necessarily the route which the planner would take: it is simply the course length route extended to avoid those hills/valleys etc which all competitors will also avoid. The intention is to give a figure which is representative of the climb which a competitor could actually undertake. As a rule of thumb, if a competitor will go over it, count it in; if you're not sure whether they'll go over it, count it in – only discount it if you are certain that all the competitors will go around it.

3.7 Proximity of Controls

Rules 6.2.3 and 6.2.4 allow some flexibility in how close together controls can be sited. This should be used with caution (and not at all in World Ranking Events: IOF rules have "shall" not "should"): it must always be possible for a competitor to decide from the map which control to go to without needing to rely on the control code, and to do so quickly. If you are going to infringe either limit, you will need a good reason which you are able to justify to competitors. Remember also that it may be necessary to allow for a little drift in the positioning of the circle on the overprint, and that in a detailed part of the map there may be some distortion in order to fit the symbols into the space available – if in doubt, measure the distance on the ground.

There is usually little point in putting controls closer than 30m apart – competitors are, in effect, navigating to the same point. An exception might be e.g. when one control is on a point feature, used by a technical course, the other on a path junction on a yellow course.

The 60m limit will be breached more often, e.g. when two successive decision points come close together on a white course (but this will require the circles to overlap even at 1:10 000, so consider taking the course elsewhere particularly if the course is not being overprinted).

Be pessimistic when interpreting 'features which appear similar in the terrain', e.g. paths and rides are obvious ones not to mix, but some vegetation boundaries have faint paths along them (or develop them as an event takes place). 'Similar features' does not just mean those mapped with the same symbol: it is not fair, for instance, to use both a fence and a ruined fence. Neither is it acceptable to claim that e.g. 'boulder (2 m) NE side' and ' boulder (1 m) SW side' are different: they are both **boulders**.

Other combinations to avoid include

- stream/ditch/linear marsh
- depression/pit/shallow re-entrant

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- knoll/spur
- re-entrant/side of a spur
- re-entrant/a feature (e.g. a marsh) in a re-entrant

Essentially, do not use any close combination of controls which could be confused by competitors.

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4. Definition of Technical Difficulty

4.1 Definitions of Terms

- 4.1.1 ROUTE CHOICE: The option of taking more than one (sensible) route between two controls. This may, for example, be a choice of two different path routes, or one of a long path route versus a direct cross-country route.
- 4.1.2 DECISION POINT: A point at which you can no longer continue in the same direction, for example being required to turn right at a path junction. A decision point on a leg does not imply a route choice. There may only be one obvious route between controls, but this could require the ability to change direction at a number of decision points.
- 4.1.3 COLLECTING FEATURE: A large feature beyond a control which, when reached, confirms to the competitor that he has completely passed through an area of ground. (A collecting feature is usually a line feature).
- 4.1.4 RELOCATING FEATURE: A distinct feature that may be used by a competitor to relocate his position on the map.

4.2 Tables

- 4.2.1 The tables which follow define the planning requirements for each level of technical difficulty ('TD'), together with the orienteering skills which are to be tested.

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TD	Routes and route choice	Numbers of controls	Control sites	Relocation and cost of errors	Skills required (letters refer to the 'Step by Step' skill categories)
1	Route all along tracks and paths. No route choice, including at the start banner.	Controls reasonably close together (200m maximum). A control at every Decision Point.	Paths, tracks – junctions, crossings and bends. Features on paths e.g. bridges, gates, to give variety to the control descriptions. The banner and punches at a control should be sited in the direction of the next control.	Should not be required.	Understand map colours and commonly used symbols. (A) Orient the map using compass and terrain. (A) Orienteer along tracks and paths. (B) Make decisions at 'Decision Points' identified by a control site. (B)
2	Route all along obvious line features such as tracks, paths, fences, walls, rivers, large ditches and very distinct vegetation boundaries. No route choice, including at the start banner.	Controls fairly close together (350m maximum). Leg lengths should not vary greatly. A control is not needed at every Decision Point, but there should be at most two Decision Points per leg.	On the line feature along which the competitor is travelling. Obvious other features close to, with the banner visible from, the line feature, e.g. knolls, boulders.	Generally should not be needed, but can be done by re-tracing the route along line features.	Orienteer along obvious line features (handrails). (C) Make decisions at a 'Decision Point' without the assistance of a control to identify it as such. (C) Leave a line feature to go to a visible control site near to it, then return to that line feature. (D)

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TD	Routes and route choice	Numbers of controls	Control sites	Relocation and cost of errors	Skills required (letters refer to the 'Step by Step' skill categories)
3	For controls not on a line feature then a route along line features to an obvious attack point should be possible. Simple route choices.	Relatively frequent controls on short courses, less so on longer ones. Legs of different lengths.	Any line feature. Prominent point or contour features, but these should be easily found from an attack point on a line feature.	There should be a collecting feature close behind all controls that are not on a line feature.	Corner cutting. (E) Basic use of compass to allow short cuts through the terrain between two line features. (F) Navigate a short leg on a rough compass bearing to a control on or in front of a collecting feature. (F) Simplification of legs with several Decision Points. (G) Make simple route choice decisions. (H)
4	Significant route choices.	As few as necessary for good planning based on the length of the course. Legs of different lengths.	Any feature which does not require map reading through complex contour detail.	Collecting features behind all controls. Errors should not be expensive in terms of time lost.	Navigate long legs on a rough compass bearing to a collecting feature. (I) Fine orienteering on short legs using an accurate compass bearing. (J) Navigate for short distances using simple contour features – hills, ridges, large re-entrants and spurs. (K)
5	Significant route choices. Course should force regular changes in technique, e.g. long route choice followed by short intricate legs.	As above.	Any feature, particularly those demanding careful map-reading to locate – but the banner must not be hidden, nor the control excessively isolated (no Bingo controls).	Control sites far from obvious relocating features. Errors can result in a large time loss.	Navigate for long distances using only major contour features – hills, ridges, large re-entrants and spurs. (L) Read and interpret complex contours. (M) Concentration over long distances. (O) Recognition of indistinct features. (O) Use all the different skills and adapt speed and technique to changes in the terrain and orienteering difficulty.