

MAPPING OF ROCK FEATURES

2.9

Introduction

1 The mapping of rock in recent years has been one of the strengths of orienteering in Australia. This has been largely because our granite terrain has presented challenges to mappers which test them to their limits particularly in the areas of interpretation and generalisation. Paramount has been the need to present to the competitor a map that conforms to the International Specifications, is legible to the competitor on the run and presents no surprises to the competitor when entering new terrain. The current mapping styles for granite developed from the WOC85 series of maps and was confirmed, standardised and publicised in an annual series of Mapping Workshops held up to the early 1990's.

2 Currently these standards may need to be publicised and reinforced to assist a new generation of mappers. Additionally the use of OCAD and other software for drawing has presented new problems which need to be addressed. Accordingly the following is a documentation of what is believed to be current best mapping practice in Australia. It must be noted that these are guidelines and not rules. Individual mappers as they gain experience will develop their own flexible approach to problems confronting them. If the results conform to IOF Specifications then they are acceptable. However the final test is acceptance by both competitors and other mappers. Constructive criticism from these quarters must be accepted, and acted upon.

International Specifications

3 For orienteering to be sustained as an international sport then maps in all countries must conform to the International Specification for Orienteering Maps. There is no doubt that excellent granite maps are made within these Specifications and to move outside them is both unnecessary and in fact puts overseas competitors at a disadvantage when competing here, and our own orienteers at disadvantage when competing overseas.

4 Within the International Specifications symbol sizes may be varied by up to 20% and within certain symbols options are available. It is primarily by using size variation and these options that the detail of granite areas is best represented in our maps. Below are listed those variations which have been widely incorporated into Australian mapping practice.

Computerised Map Drawing

5 Drawing of orienteering maps by computer is now the norm and OCAD has become a virtual industry standard. Fieldwork is still carried out in the traditional way, however the computer drawn map often has distinctive features which the drawer must be aware of. The first of these is that line widths are absolutely correct, with drawing with ink there was always a spread of ink so that a line specified to be drawn with a 0.25 pen was actually 0.26 to 0.3 in thickness. In OCAD the default contour is 0.13 at printed size, yet in all maps the OCAD contour appears too thin. Secondly the standard for point features was the sheets of "Letraset" type symbols that were widely available. No matter their origin these were invariably slightly larger than the strict IOF Specification.

6 Thus using the default symbols in OCAD while technically correct will give an incorrect picture. Some users have taken this to mean that with thinner lines more detail can be mapped, but with this approach maps are losing their legibility. In these guidelines recommended line and symbol sizes for OCAD are given and a standardised symbol set in OCAD is available through Alex Tarr or

Eric Andrews which conforms to these guidelines

Fieldwork of Rock Features – General

- 7 The general rules for mapping rock features are:
- Interpretation is based on what the runner sees when first entering an area. The mapper should not give any great significance to features noticed only after being in an area for some time. Basically **we must map the big features well and be prepared to generalise the rest**. On the final map the larger features must stand out from the clutter of smaller features.
 - The mapping of the features must be such that the runner can get a realistic picture of the terrain by reading ahead on the map. There should be no surprises for the runner when entering an area.
 - In many cases there is more than one way to map a feature, the fieldworker must be aware of and explore all the options before choosing the best option in the context of the feature and the area.
 - The map is made up of symbols : area symbols are the only ones to correct scale on the map. Line symbols are correct as to length but exaggerated in width. Point symbols are larger than the feature in every direction (four small boulders take up the same map area as the average suburban house). The clear distinction between point, line and area symbols must be recognised. The mapping of many point features in areas of detail leads to a breakdown in legibility and relative positioning of features. The fieldworker must understand the concepts of generalisation, relative positioning and map legibility to map areas of detail.
 - The runner will often navigate to avoid large blocks of black areas on the map. The gaps between the black are highly significant to competitive orienteers, these gaps must be reliably and accurately mapped.
 - In areas of rock the landform bears very close conformity to the rock features. Therefore the contours showing the land shapes must bear the same relationship to rock on the map as it does on the ground.
 - Contour shapes are paramount, accurate depiction of contours is essential for the confidence of the orienteer and often provide the most unambiguous control sites for the course setter.
 - In granite, other rock terrains and all worthwhile orienteering areas there is no need to try and create control sites. **The map is made for the orienteer, not the course-setter.**
 - The classification of features by the fieldworker becomes a problem at the margins. As a rule of thumb if there is an ambiguous choice between use of different symbols then the simplest solution should be taken usually using the symbol which has the lesser impact on the map.
 - Minimum dimensions of and between symbols must be maintained if the map is to be legible. Minimums are set out at Section 3.2 of the IOF Specifications. When using OCAD it can be difficult to determine minimum dimensions. As a rule of thumb features in the same colour should be separated by at least the width of a single contour for black and brown, with greater width between other colours.
 - The mapper should make a judgement about areas on the map in which any feature mapped would be a likely candidate for an unfair control (features in dark green, extremely hazardous areas, etc.) Such areas should be mapped in a generalised way so that the hazard is obvious but they are not attractive to an inexperienced course setter for the placement of controls.

Scale

8 For classic event orienteering the IOF approved scale is 1:15,000 and this scale should be used for national level events in Australia. In complex areas 1:10,000 scale prints of the 1:15,000 map should be produced for older and younger age groups. Additionally 1:10,000 scale maps may be used for short event orienteering for elite classes. For both 1:15,000 and 1:10,000 maps fieldwork should be at the scale of 1:7,500.

Rock Features

9 The following notes should be read in close conjunction with the IOF Specifications, they supplement the Specifications for Australian conditions. **These notes do not replace the IOF Specifications.**

201 Impassable cliffs

- Extended lines of impassable cliffs are a hazard to the orienteer and a significant determinate of route choice. Any gaps shown whether as full breaks or as a change to passable cliff must be both genuinely passable and capable of being recognised by the orienteer in competition conditions.
- The "quarter moon" (☾ symbol is typically used widely for both impassable and passable cliffs.
- The use of tags is usually to emphasise particularly dangerous or prominent cliffs.
- The length of the tag in the Specification extends over 7.5 metres on the map together with the bar of 5 metres this greatly exaggerates the area that an essentially line feature covers. Tags when used are often shortened to avoid this. The tags, however, can and should be lengthened to show a feature comprising a sloping cliff that extends for a considerable distance. In this case a line feature is used to map to scale an area feature.
- Very short cliff faces while technically impassable are mapped using the passable rock face symbol (203) if they can be easily passed on all sides and are insignificant in regard to route choice.
- Rounded ends or ends which taper off into passable rock faces are used as necessary.

202 Rock pillars/cliffs

- This is an area feature showing a massive boulder to scale.
- It does not make sense for this symbol to be used for both rock pillars (massive boulders) and cliffs as the orienteer cannot picture in advance what the terrain will look like. It is Australian practice to only use this symbol for massive boulders which can be shown as area features to the correct scale on the map.
- Like all features these boulders are mapped from the orienteers viewpoint, that is the impression gained when running into and through an area rather than a close-up examination of the feature. Thus slits or cracks in the rocks are ignored if the overall impression is of a single entity.
- Often the size of the feature must be exaggerated to ensure it stands out from the surrounding point symbols of small, medium and large boulders which in turn take up much more room than their actual feature.
- Australian practice reserves this symbol for features which are not only massive but also are very high. Options for lower features include circular rock faces, rock face plus contour or high point

203 Passable rock face

- Tags should only be added if there is ambiguity over which way the feature faces or if the face extends for considerable distance horizontally.
- * Care should be used when using this symbol as a circular rock face for large, low boulders as it often grossly exaggerates the size of the feature. Other options include combinations of contours/high points and shorter rock faces.

Boulders

10 **Every boulder on the map should be immediately identifiable on the ground.** The mapper should set minimum sizes for various size boulders according to the terrain. Individual boulders should generally conform to the standard however other boulders may be mapped if they are particularly distinctive in the terrain. The sides of boulders should have a high degree of verticality, if the feature can be run onto or over then other options should be tried - mapped as a high point or combined rock face/contour. The boulder symbols are also used for boulders which are split, shattered or piled on top of each other, interpretation is based on what the orienteer sees when entering the area.

11 Interpretation in the field can present some problems. If there is doubt on first viewing the feature then it should be viewed from a distance from all four sides and mapped as its majority view. Interpretation must not be done through close up examination of the feature.

12 Symbols 206 and 207 are for point features, very large boulders which can be shown to correct scale are drawn with symbol 202 and should reflect the actual scale and shape of the feature.

206 Boulder

- * IOF definition includes "minimum height 1m. ...Every boulder on the map should be immediately identifiable on the ground." Immediately identifiable is to the competing orienteer. If there is any doubt the feature should either not be mapped, included as part of rocky ground or as part of a boulder field.
- the allowable 20% variation in symbol size must not be used to reduce the size of this symbol.

207 Large boulder

- IOF: "particularly large and distinct boulder" should be immediately identifiable to the competing orienteer entering the area.
- as a rule of thumb no more than 10% of all mapped boulders should be large boulders.
- large boulders may be mapped in areas of boulder fields of smaller boulders if they meet the IOF definition.
- massive boulders which can be drawn to correct size are mapped with symbol 202.

Medium boulder

- It is Australian practice to use a .5 medium boulder for features which are distinctly larger than the small boulder. This allows for the 20% variation in symbol size permitted by the IOF (20% smaller than IOF 207). Use of this feature is particularly useful when two adjoining boulders are of distinctly different size.

208 Boulder field

- this is an area symbol which will show the extent and shape of the boulders mapped.
- used for:
 - o an area of three or more mappable boulders which cannot be drawn to scale
 - o an area of mixed boulders and near boulders, the individual boulders within which cannot be drawn so they are immediately identifiable to the competing orienteer. Such an area can include passable rock faces as part of the boulder field.
 - o a group of smaller boulders associated with a larger rock feature
 - o IOF specifies the size of the symbol as .3 to .8 on the long side of the triangle (with the 20% variation allowed this means symbols from .25 to 1.0 are permitted). In practice symbols less than .5 both give the wrong picture and are difficult to distinguish from rocky ground. The OCAD default symbol should not be used unless it is enlarged to at least 140%.
- Within the specified sizes different size boulder field triangles may be used depending on the size and aspect of the feature. In general larger, "chunky" triangles should be used for boulder fields made up of larger boulders.
- "Thin" triangles with an angle larger than 90 degrees should be avoided as they can be confused with the passable rock face symbol.
- Boulder field triangles should not be used singly except when in association with another (usually larger) rock feature.
- When a single triangle is used with an associated rock feature it should be orientated so that its shape best reflects the feature.
- Runnability within the boulder field is shown by the density of the triangles.

209 Boulder cluster

- IOF: "A small distinct group of boulders so closely clustered that they cannot be marked individually."
- A rock on top of another rock is not a boulder cluster but an individual boulder.
- The boulder cluster is a point symbol, the feature should be restricted in area (at least smaller in area than the symbol), with defined edges. A rule of thumb is that if the feature would not make an unambiguous control site then it should be mapped as a boulder field rather than a cluster.
- If the cluster includes a boulder that is significantly higher than the others then the significant boulder should be mapped with the appropriate symbol and the others either generalised or left off.
- The allowable 20% variation in symbol size can be used to show the difference between large and small clusters (in OCAD use 90% or default symbol for standard size clusters, 120% for larger clusters.)

210 Stony ground

- IOF: "Stony or rocky ground which affects going ..."
- local practice uses the symbol to show significant rock which is not shown with the other symbols as well as rocky/stony ground which affects runnability.
- IOF specifies the size of dot as .125 to .175, the OCAD default is .2, experience shows the IOF dots are barely legible at printed size. The OCAD .2 dot is the smallest that is acceptable. If a single dot size is used then a .22 dot is recommended.
- the use of two dot sizes is allowable under the 20% size variation. This

covers the situation (more usual in some gully/spur terrains than granite) where there are both distinctive rocky outcrops and areas of ankle-breaking slow run stony ground. Dot sizes in this situation would be .25 and .2.

- the stony/rocky ground will often include marginal boulders and rock faces which should be included as part of the black dot symbol. Boulders or rock faces which are immediately identifiable in the area must be drawn so that they are immediately identifiable within the stony ground symbol.

212 Bare rock

- IOF defines as "flat area of rock ..", the correct definition is runnable area of bare rock (which may be at a considerable angle.)
- there is a continuum between bare rock to moss covered rock to clearing. In Australia practice is to include the moss covered rock within the bare rock with the clearing being mapped in the relevant yellow.
- in granite terrain sloping bare rock may be runnable to the competitor going uphill but be a passable or even impassable cliff going downhill. In this situation the bare rock is mapped with the relevant cliff symbol superimposed.
- runnability is judged by the mapper as in dry conditions, the competitor must make their own assessment in actual competition conditions.

112 Small knoll

- in granite the brown dot knoll is almost always a rock feature
- round contour feature too small to be drawn to scale with a contour, should be one metre above the surrounding ground.
- contours should be used if the feature has a definite shape, grey should be added if the feature is bare rock. The IOF Mapping Committee has specifically ruled that the symbol is a point feature and should not be drawn in shape other than round.
- must be used very carefully in association with other features (the brown dot is obliterated by a rock face and obliterates the grey of bare rock)

Additional symbols

13 There is a potential danger in the use of OCAD in the ease in which additional symbols can be made. Local experience shows that except for those listed above there is no advantage in using additional symbols. Even symbols such as 208 Boulder field, which the Specifications give a range of sizes, meet almost every situation with three variants. Producing a greater number of symbols greatly complicates the fieldwork process with illegible differences in the printed map.

14 A disk with a default OCAD symbol set and a legend which includes all the variations listed in these guidelines together with relevant changes needed for gold-mining terrain is available from Alex Tarr or Eric Andrews.

Relation of Rock Features to other Symbols

Other black features

15 The representation of man-made features among areas of rock presents some difficulty for the mapper if legibility is to be maintained. Tracks are of major significance to the orienteer, to ensure that it is legible on the map the track should be mapped first. If necessary the surrounding rock can be shifted

slightly and generalised so that the track becomes the central figure. With black point features the mapper must first make a judgement about the importance of the feature to the orienteer and if it is to be mapped. If it is to be mapped it must be legible among the surrounding rock features. This can be achieved by generalisation as described in Section 2.4 of the IOF Specifications.

Brown features

16 Rock faces and cliffs should bear a strong relationship to the underlining contours with the contour being extremely likely to be on the cliff line. Similarly bare rock areas often form areas of raised ground or spurs and this should also be reflected in the contours.

Blue features

17 Clear space must be allowed so that the short watercourses, small marshes and other water features are clearly legible. Care must be taken that the correct PMS blue is used, if a darker blue is used the small circular waterholes are easily confused with boulders.

Green features

18 In detailed areas passageways between and through rock features are important to the orienteer. The greens must be mapped to reflect this.

Yellow features

19 There is a fine dividing line between bare rock and open land. The judgement should be made on the impression gained on first entering the area. If the impression is of runnable rock then it should be mapped as bare rock even if it is generally covered with lichen or moss. If a grassed clearing then as open. The area can be generalised with open areas having small areas of bare rock and bare rock areas having some small grassed strips or patches.

Variations to IOF Specifications

20 In many detailed granite maps the mapper may find one or two places where a minor variation to IOF Specifications seems necessary. This may entail the use of a symbol in a non standard way or a non-standard variation in size or shape of a symbol. This is allowable provided the site is not used for or is not crucial in finding a control site.

21 Any significant variation from IOF Specifications or from practise spelt out in this document must under OA Competition Rules be approved by the relevant mapping body. For international events this is the IOF Mapping Committee. For national events (including Australian Championships, Australian 3-Days) approval is required from the Chair of the OA Mapping Committee. Variations for other maps requires the approval of the relevant State/Territory Delegate to the OA Mapping Committee or State/Territory Mapping Officer.

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