COLOUR ME SENSIBLE

Peter Smart offers a response to Steve Hencher’s critique of EC7.

Re-typed from *Ground Engineering*, September 2008, p. 10 only, E&OE.

In July’s *GE* *, Steve Hencher raised some important points about soil and rock description in *The “new” British and European standard guidance on rock description*. Whilst I sympathise with the BSI Committee negotiating with ISO and CEN, these issues need to be addressed. The following takes up one of them.

It is surprising that neither BS EN ISO 14688-1: 2002 nor 14689-1: 2003 specify the use of Munsell color charts. This is because BS ISO 15903: 2002 *Format for recording of soil and site information* specifies ISO 11259: 1998 *Simplified soil description*, which, according to the draft of 1996, specifies use of a soil Munsell color chart. Moreover, the 2006 draft of ISO 25177 *Brief soil description* also specifies use of the Munsell soil color charts.

Not only did BSI 5930 specify Munsell charts for both soil and rock, but the Soil Survey of England and Wales *Soil Survey Field Handbook*, 1976 also specified Munsell soil color charts, requiring the colours to be recorded if possible in both the dry and moist (not wet) states and, optionally, from rubbed samples. It also required colours to be recorded for both the interiors (fractured or cut surfaces) and exterior surfaces of the structural units.

In addition, precise rules were given for the description of mottling. These requirements appear to be the generally accepted international practice, but are at odds with ISO 14588-1. This gives an alternative rule, which should be followed for soils containing green rust, but not generally. In passing, perhaps some competent person could write a review of green rust.


There are two further difficulties with ISO 14589-1 Section 4.2.1. It attempts to cater both for clients who require a full description and also for clients whose needs can be met by a cheaper and quicker method. What is required should be agreed in advance. If a quick method is required, then the terms in Table 1 are probably satisfactory, but they are not hue and not chroma; and using them as such will result in misunderstanding. The headings should be corrected. Also, ISO 14688 and 14689 should use identical wording.

There are some general difficulties with the Munsell system. First, a significant proportion of men and a few women cannot distinguish colours sufficiently well.
Second, it seems that in the northern hemisphere, light from a lightly overcast sky is best; while direct sunlight (avoiding sunrise and sunset) is next best. Shading by the body and dappled shade should be avoided. Reflection from nearby walls or the sides of the pit are seldom mentioned. Taking samples back to camp on difficult days has been suggested. In the laboratory, the preferences seem to be, in order: CIE D65 source, CIE C source and sewing lamps - fluorescent tubes are to be avoided.

Third, some Munsell charts and some imitations lack holes between the chips, may lack masks and also can have a restricted number of pages. Some also, so I understand, include a few glossy chips, presumably to extend the range beyond that possible with matt chips. Advice on the suitability of these would be welcome.

Fourth, the Munsell coding is slightly non-linear. On the other hand, successful use has been made of Munsell codes, either directly or after conversion to CIE coordinates, in statistical regressions.

However, the immediate need is for standardisation: could the BSI list which charts are approved in the national foreword, with an escape clause enabling the client to specify others or none?

It is surprising that no mention is made of colour photography. At one time, I used Kodachrome 25 in a 35 mm camera, with a macro lens set to 0.5x magnification (field of view 50 x 75 mm), and with a flash gun which could be placed at 30°, 45°, or 60°, to the axis of the camera. Up-to-date systems would enable detailed analyses to be made by computer. An alternative would be to use a hand-held spectrometer, which might overcome the limitations of the three-colour systems. Further research and development seem to be required here.

There is a general point which is being forgotten: a Standard is a buffer between the contractor and the client, telling one how much to provide, and the other what not to expect.

*Peter Smart is honorary senior research fellow with the Civil Engineering Department of the University of Glasgow*