

Guide to Safety at Sports Grounds

Annex C:

Guidance on colour vision deficiency (colour blindness)

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Introduction

This guidance is intended to provide all those working in the safety management and operation of sports grounds with a basic understanding of why it is important to be aware of colour vision deficiency, more widely known as colour blindness.

As stated throughout the *Guide to Safety at Sports Grounds* (for which this document forms an Annex), there will almost certainly be members of staff, stewards and spectators who are colour blind and who may therefore have problems interpreting important safety information.

It is emphasised that the guidance provided here is not intended to be definitive, nor to apply in all circumstances.

Note also that when viewed on computer screens and other electronic devices, the rendition of certain colours in this Annex, and in other sources, may vary.

Before taking action therefore, management should seek the the advice and assistance of suitably trained and competent persons.

Readers are also advised to check the sources listed for further technical information.

Finally, as this is a relatively new area of guidance in the realm of sports grounds safety, the Sports Ground Safety Authority welcomes comments and feedback.

Both the *Guide to Safety at Sports Grounds* and this Annex are compiled and published by the Sports Grounds Safety Authority, Fleetbank House, 2-6 Salisbury Square, London EC4Y 8JX

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C.1 Introduction to colour blindness

Colour blindness (or colour vision deficiency) is the inability to perceive colours normally. It is a common genetic, or hereditary condition, in the United Kingdom affecting approximately one in 12 males and 1 in 200 women – the equivalent of almost three million individuals – to a greater or lesser extent. Less commonly, colour blindness can develop as the result of certain chronic illnesses, accidents and the ageing process.

Ground management should therefore assume that there may be members of staff, stewards and a significant proportion of spectators who live with the condition.

Colour blindness has safety implications for the following reasons.

a. Safety management

Members of the safety management team, including stewards, may be unable to interpret accurately information that is conveyed by colour alone, for example:

- i. within management documents, such as ground plans, the *Operations Manual* or the stewards' *Code of Conduct*
- ii. within training materials
- iii. within maintenance documents and plans, such as circuit diagrams
- iv. on wipe boards or display boards
- v. on safety related signs
- vi. on control panels and alarm systems, including warning lights
- vii. on websites
- viii. on computer screens and/or software.

Similarly, members of the safety management team may be unable to distinguish between colleagues wearing differently coloured high visibility jackets (see Figure B).

b. Spectators

Spectators may be unable to interpret accurately colour coded information:

- i. on tickets
- ii. on ground plans
- iii. on wayfinding signs
and may be unable to
- iv. clearly see safety related signs or emergency equipment against certain backgrounds
- v. easily follow emergency evacuation routes
- vi. distinguish between differently coloured seats.

(A further, non-safety related implication for spectators, is that, in many sports, players and athletes wear colours that to people with normal vision appear obviously different from those of their opponents, but which to colour blind spectators are virtually indistinguishable.)

C.2 Management responsibility

As stated in Section 3.40 of the *Guide*, management should be familiar with the Equalities Act 2010. The Act covers issues in the workplace and in wider society – such as discrimination arising from gender, age, disability, religion and race – setting out the different ways in which it is unlawful to treat someone.

Under the Act 2010 a person is considered to have a disability if they have a physical or mental impairment which has a substantial and long-term effect upon their ability to manage normal, every day activities. Although colour blindness is not specifically cited in the Act, the Government Equalities Office does recognise that colour blindness can be a disability.

It is therefore emphasised that the management of sports grounds should be aware of their responsibilities as set out in the Act.

Further guidance is available from the [Government Equalities Office](#).

It should also be noted that many people with colour blindness have not been formally diagnosed, or are not even aware that they have the condition. Or they may be aware, but prefer not to tell anyone. It is therefore recommended that rather than test or assess individuals for colour blindness, management should ensure that an awareness of colour blindness forms a part of routine training programmes.

Furthermore, under the Equalities Act 2010, other than in exceptional circumstances colour blindness cannot be deemed a reason for not employing or contracting an individual for safety related duties at a sports ground. Instead, in most instances an employer should take reasonable steps to accommodate employees who are colour blind.

C.3 Management strategies for colour blind compliance

Using the *Guide* in conjunction with the resources listed in Section C.4, management should undertake a review, and where necessary a risk assessment of all aspects of the ground's safety management procedures, to determine whether or not action needs to be taken.

It is emphasised that any remedial measures should be overseen by competent persons. For example, it is not advisable for management to act solely on the advice of a staff member who is colour blind. This is because there are several different forms of colour blindness and one, untrained individual is therefore unlikely to have the experience or knowledge to suggest changes that will be fully compliant with the needs of all colour blind people.

The two main concerns for management at a sports ground are as follows.

a. Information conveyed solely by colour

Information conveyed solely by colour – whether in printed materials or in digital form, on tickets, signs, ground plans, seats, screens, warning lights or in any other form or context – should either be:

- i. supplemented wherever possible by clearly legible written information, or
- ii. replaced and redesigned according to the recommendations contained in the guidance listed in Section C.4.

b. Information or signs conveyed in colours in a way that may not be distinguishable

There may be examples of safety related information that conforms with the requirement above but is nevertheless presented, displayed or located in such a way that makes it difficult for people with colour blindness to see.

One example is a standard green emergency exit sign featuring, as recommended by ISO 7010, a white pictogram supplemented by white text, that is mounted on a plain concrete background, or hung from a ceiling but viewable only against a backdrop of plain concrete, as shown in Figure D.

Another example is a sign or a ticket in which, owing to the combination of colours used – such as black text on a red background, orange text on a green background, or white text on a yellow background – the text is difficult for colour blind people to read. The choice and size of the font may also be problematic.

In such instances, the simplest solutions are:

- i. to frame, or edge the sign, or piece of text, in a sharply contrasting colour, or
- ii. to change the colour of the background surface on which the sign is mounted, or the background on which the text appears (see Figure D).

If neither of these solutions achieves the required legibility the sign or text should be replaced and redesigned, according to the recommendations contained in the guidance listed in Section C.4 below.

C.4 Further guidance

In order to meet the requirements for adequate colour contrast it is important to understand Light Reflectance Values (LRV); that is, the amount of light reflected by a surface when illuminated by a light source. The LRV scale ranges from 0, a perfectly absorbing surface (black), up to 100, a perfectly reflective surface (white).

[Document M of the Building Regulations](#) considers an adequate colour contrast to be a minimum of a 30 point differential in LRV between two surfaces.

Guidance on LRV levels can also be found in [BS 8493:2008+A1:2010](#)

Further sources of information and guidance on measures to accommodate the needs of people with colour blindness, both in the context of sport and in the wider public realm, are as follows:

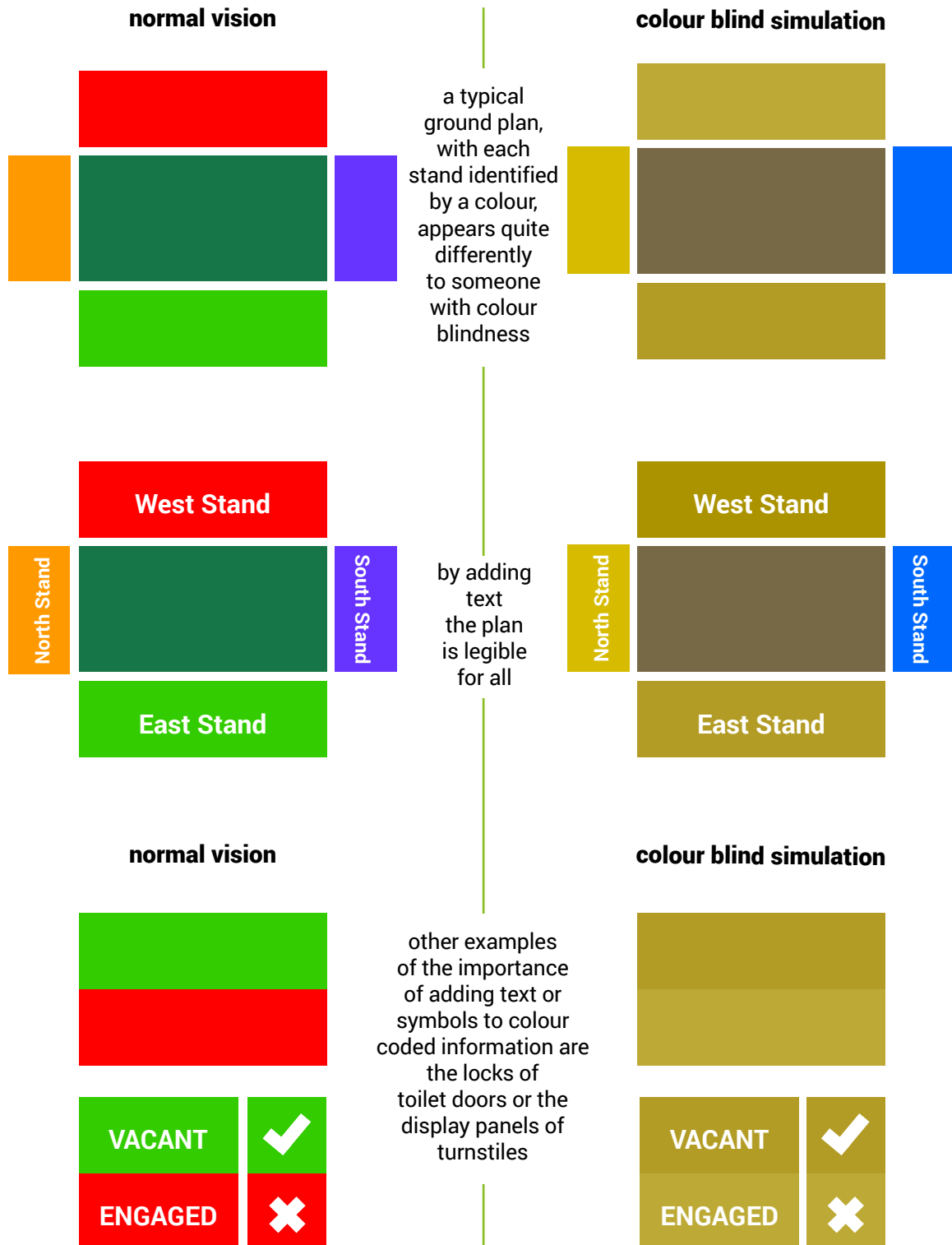
[Colour Blind Awareness](#) – an information and training resource

[Colour Blindness in Football](#) – a guidance document published by The Football Association (FA) and The Union of European Football Associations (UEFA)

[Colour vision examination – a guide for employers](#) published by the HSE

[A guide to understanding and implementing Web Content Accessibility Guidelines](#) - a technical resource for designers of digital information, including guidance on minimum colour contrast ratios.

Figure A *Supplementing colour coded information with text or symbols*



Note that the colour blind simulations shown here illustrate different forms of severe red or green colour blindness. Other forms of colour blindness result in differing colours and contrasts.

Figure B *Supplementing colours with text or symbols*

normal vision	colour blind simulation	
<p>These two high visibility jackets are colour coded to help the safety management team distinguish between individuals deployed in different roles</p>	<p>This is how the same two jackets look to someone with colour blindness; that is, virtually indistinguishable.</p>	<p>By adding clear text the different roles are easily distinguishable. (Note that numbering individual jackets is also recommended in the <i>Guide</i>.)</p>

Figure C *Supplementing colours with patterns*

normal vision	colour blind simulation
<p>diagrams, plans, maps and other means of wayfinding should not depend on colour alone to convey meaning</p>	
<p>adding hatching, stippling, patterns, underlining or symbols enables people with colour blindness to interpret the information accurately</p>	
<p><i>Note that the colour blind simulations shown here illustrate different forms of severe red or green colour blindness. Other forms of colour blindness result in differing colours and contrasts.</i></p>	

Figure D *Colour contrasts and backgrounds*

normal vision



A standard fire exit sign mounted on a plain concrete background (left) stands out for someone with normal vision but not for someone with colour blindness (right).

colour blind simulation



A strongly contrasting border makes the sign more prominent.



A strongly contrasting background also makes the sign more prominent, but not as effectively as the yellow border above.



Suspended signs can also be lost against neutral backgrounds. In such instances a strongly contrasting border, as seen above in yellow, should be added



Note that the colour blind simulations shown here illustrate different forms of severe red or green colour blindness. Other forms of colour blindness result in differing colours and contrasts.