

SOLAR SHADING AND GLARE

Summary

- ✓ Employers have a duty to control glare.
- ✓ Light levels are dynamic, glazing is static and cannot adapt.
- ✓ Accurately controlling light and glare can be achieved with effective solar shading.
- ✓ There are many factors to consider when specifying solar shading and other benefits such as gaining free solar energy for heating should also be considered.

1.0 INTRODUCTION

Glare is defined as:

“The condition of vision in which there is discomfort or a reduction in the ability to see significant objects, or both, due to an unsuitable distribution or range of luminance.”

Dictionary of Architectural and Building Technology, 2004

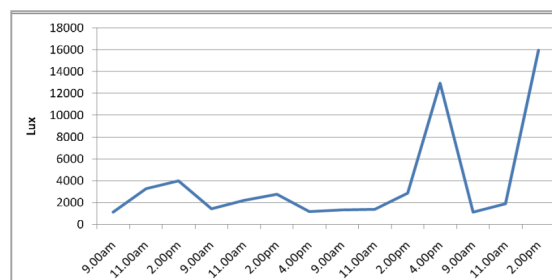
There are two types of glare. One type is perceived as the strong, dazzling light affecting our eyesight and the ability to see out of a window clearly and comfortably. The other is a screen glare on computer or television screens caused by a lower light level.

2.0 THE CAUSE OF GLARE

Glare occurs when parts of the area within a field of vision have a much higher luminance (degree of brightness) than the surroundings - for example reflections from glass or metal surfaces.

Glare is caused by light sources such as lamps, overhead lights or the most powerful of all - the sun. Under clear sky conditions direct sunlight can give a powerful illuminance of 100,000 lux (measure of illuminance). If the direct sunlight is diffused, for example by clouds, the number can drop to 40,000 - 50,000 lux. To put this into perspective, the Chartered Institution of Building Services Engineers (CIBSE) code for lighting states that “for a general office (tasks such as computer work, writing, drawing) a recommended lux level is 500 lux”.

The graph below shows the drastically different light level readings over a 5-day period for an office space lit by an atrium. In this example the light levels varied from 1,150 lux to 16,000 lux.



Light levels over a 5-day period - 17 -22 June

3.0 THE NEED FOR GLARE CONTROL

Glare can affect the ability to carry out work, in particular computer-based tasks and in some instances it can make computer screens unreadable. In order to control glare, some might take to extreme actions such as blocking the light out totally by using opaque window blinds and then controlling lux levels with internal lighting. This is wasteful of energy, polluting and unnecessary. Positioning desks away from glazing and highly reflective surfaces could help but will inevitably lead to a poor utilisation of the space.

The Health & Safety (Display Screen Equipment) Regulations 1992 state:

“Workstations shall be so designed that sources of light, such as windows and other openings, transparent or translucent walls, and brightly coloured fixtures or walls cause no direct glare and no distracting reflections on the screen. Windows shall be fitted with a suitable system of adjustable covering to attenuate the daylight that falls on the workstation.”

To read the document, see: <http://www.hse.gov.uk/pubns/indg36.pdf>

4.0 SOLAR SHADING SOLUTIONS

In a commercial environment there is a requirement to control glare. Correctly specified and selected solar shading offers an effective solution. Solar shading has the ability to spread and reflect the light and produce an even, broad light source that will reduce and even eliminate glare. Reflected light through solar shading is diffuse and does not create glare.

When selecting the right glare control product, it is important to consider the light transmittance (T_{vis}) of the blind system (see Guidance note S-17A). In Section 2.0, the peak light gain measured was 16,000 lux. To achieve the CIBSE recommended 500 lux, in this example you will need a blind system with a T_{vis} of 3% or less.

There is a wide range of both internal and external shading products that will help to control glare and a BBSA member will be able to advise you on the most appropriate solution.

4.1 HELP OF BREEAM FOR NEW BUILDING DESIGN

BREEAM is the world's leading sustainability assessment method to measure new building excellence and points can be gained for glare control with shading. Studies by the Building Research Establishment (BRE) have shown that all of the energy saving measures in the original design, glare control is the most likely to be removed to save construction costs as there is a lack of understanding of its importance.

5.0 ACHIEVING THE BEST RESULTS/MAXIMISING BENEFITS

Solar shading can serve many functions. It can reduce glare as well as heat gain in the summer months and can maximise the gain of the free solar heating energy in the winter although this solution may not provide the right winter glare control due to low sun angles.

There is a need to prioritise requirements. It may be that two blinds will be required to provide the most efficient and cost effective solution. Generally, an external blind would typically be the most efficient for reducing or allowing heat gain whereas an internal blind with user control would be the best solution for controlling glare.

6.0 FURTHER INFORMATION

CIBSE Code for Lighting 2009

<http://tinyurl.com/5unbgse>

See the BBSA video on glare here:

www.shadeit.org.uk

See further details in the BBSA's Guide to Low Energy Shading (GLES).
