

## Information Paper

## Control of solar shading

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**A wide range of dynamic shading systems is available. The way these systems are controlled can have an important impact on building energy efficiency and on occupant comfort and wellbeing. This Information Paper gives guidance on whether to use automatic or manual control or a mixture of the two, and describes control strategies and ways to implement them. It will be of interest to building designers, services engineers, shading manufacturers and installers. It replaces BRE Information Paper 12/02, which is now withdrawn.**

## Introduction

Solar shading can have a major impact on building energy use and occupant comfort (see *Solar shading of buildings*<sup>[1]</sup>). Moveable shading is especially appropriate for many buildings. During times of peak solar gain such shading can reduce cooling loads<sup>[2, 3]</sup> and overheating. Under cloudy conditions, or in winter, it can be retracted to allow daylight and useful solar gain to enter the building, thereby reducing the building's dependence on electric lighting and its heating requirement.

This strategy requires that the shading be appropriately controlled. Otherwise unwanted solar gain may enter the building, causing overheating. Occupants may experience glare from the sun and be unable to operate the shading to alleviate it. Conversely, and more commonly, the shading may be in place at times when it is performing no useful function; this can lead to excessive use of electric lighting and occupant complaints about loss of view out.

Manual operation of shading systems by the occupants using cords, chains or crank handles is still common. This type of control is principally used for internal blinds, although some external and most mid-pane systems can also be controlled in this way.

However, a wide range of motorised systems, including battery- and solar-powered options, is now available for all



**Figure 1:** Occupant control of motorised blind using a wall-mounted controller. The controller fits in a holster on the wall, so can be removed and used as a hand-held remote

types of shading device. Motorised operation is generally more expensive, but has a number of advantages:

- Control by the occupants is often easier; a wall switch or hand-held remote control (Figure 1) is usually easier to operate than a pull cord or crank handle, particularly for disabled users.
- As there are no cords or chains, motorised blinds can be a safe option where babies and young children may be present.
- In dwellings, timed operation of blinds can make it look as if someone is at home when the occupants are away.
- For large shading systems or where access is limited, mechanical control by cords or handles may be difficult or impossible. Motorisation allows a number of blinds to be moved at the same time using a single press of a button, eg in a large space like a hall or atrium.

2.1 Solar shading types and functionality. When it comes to controlling or altering the thermal- as well as the light transmission properties and performance of a facade, several ways of controlling this performance are possible. The traditional way of altering the amount and distribution of incident solar radiation is done by using solar shading systems. In this context, this could be easily considered as a low-tech alternative, but it might nevertheless be an effective alternative. In the field of solar shading, there exist primarily three main types of shading: internal-, external- and in-between-pane shading systems, as described in Table 1. Table 1. Table 1. Solar shading types and classification with some picture examples. Thus, solar control and shading can be provided by a wide range of building components including: Landscape features such as mature trees or hedge rows; Exterior elements such as overhangs or vertical fins

Â Solar Control and Shading Devices by Olgay, Aladar and Olgay, Victor. Princeton, New Jersey: Princeton University Press, 1957.â€”The classic source for information and examples of sun control and shading devices. Sun Protection: An International Survey by Danz, Ernst. New York: Frederick A. Praeger, 1967.â€”Out-of-print, but worth finding, it offers many provocative photographs and illustrations of shading devices from around the world. Solar shading eliminates direct sunlight to help keep a space temperate and energy-efficient, while continuing to reap the rewards of big windows. Solar shading reduces glare and heat gain to help keep a building cool and comfortable. This means it also reduces energy costs in the building: By providing glare-free natural light, solar shading reduces the amount of artificial light required during the daytime. Lights can be equipped with sensors to turn off or dim when the space is naturally bright. Plus, by combating heat gain, solar shades diminish the need for air conditioning. In combination with other passive strategies, including night cooling, solar shading has the potential to eradicate the need for air conditioning altogether, depending on the location. Types of Solar Shading.