Technical Note No 50

Shading and solar gain

Shading is widely used and becoming one of the methods of reducing over heating of buildings by solar gain. Shading is also increasingly required to reduce levels of glare in internal spaces. This Technical Note describes ways of achieving appropriate shading and the consequences of using shading devices, including the unintentional shading of fenestration.

This Technical Note should be read in conjunction with:

TN 13 Glass breakage
TN 51 Environmental control glasses

Introduction

This Technical Note gives a background to the need for shading including solar gain and glare. It gives guidance on the effectiveness and practicalities of different types of shading devices.

Appendices give methods for calculating shadow patterns.

Why shading?

Shading devices may be provided for any of the following reasons;

- Reduction of solar gain
- Control of solar glare
- Control of sky glare
- To achieve a particular aesthetic

Other features of the facade, such as window reveals and balconies may unintentionally shade parts of the building envelope. Also features such as trees, and adjacent buildings may considerably affect the direct radiation.

Solar gain

Incoming solar energy includes radiation in the entire range from 300 2500 nm. Energy that is absorbed by any surface will heat up the surface and this includes internal surfaces such as walls, floors and furniture.

Shading devices may be designed to exclude, or reduce the amount of, solar radiation entering the building.

The intensity of the incident short wave radiation will depend on the sky conditions, the angle of altitude of the sun and the angle of incidence on the surface, Appendix B.

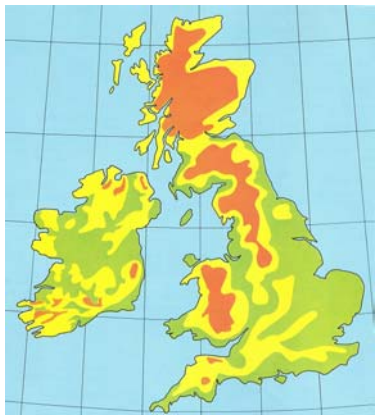

Figure 1 Insolation over the UK

Clear sky solar intensities in the U.K. vary very little as a result of change of latitude (52 – 55^{o} N) and are more dependent on altitude. The maximum intensity of solar radiation is in the range 750 – 800 W/m^{2}