DOUBLE SKINNED FAÇADES (DSF)

SUMMARY

Benefits of integrating blinds into DSF

- ✓ Allows large glazing to be used.
- ✓ Reduces energy consumption by helping to control heat gain in the summer and heat loss in the winter.
- ✓ Transforms a static element into a dynamic one.
- ✓ Improved internal environmental leads to higher productivity.
- ✓ Allows for natural light to be harvested but glare controlled.
- ✓ Improves acoustic properties.
- ✓ Assists with building compliance.

1.0 INTRODUCTION

Look at any city skyline and the architectural trend for a transparent building envelope is obvious. Heavily glazed façades are a popular contemporary choice even in much hotter climates than the UK's, providing a window on the world and harvesting natural light.

To comply with the Building Regulations for England and Wales new buildings must achieve a target Emissions rate for CO_2 emissions. Part L of the Regulations, Criterion 3 contains guidance on how to limit the effects of solar gains in buildings in the summer. It also provides a calculation method to ensure that a building will not exceed the target emissions rate and overheat in the summer months.

2.0 STANDARD FULLY GLAZED FAÇADE

A fully glazed façade can cause issues for the building's occupants through:

- excessive heating demand during the winter, and
- overheating of the building.

A difference in the surface temperature of external walls and the indoor environment results in discomfort for the occupants situated near the façade such as draughts and asymmetric radiation.

3.0 DOUBLE SKINNED FAÇADE (DSF)

A double skin system consists of an external glazing, a ventilated cavity and an internal glazing. This helps to minimize the unwanted side effects of the standard fully glazed façade by allowing ventilation between layers.

The Shard is a typical example of a double skinned façade and was only possible with shading in the façade that achieved a g_{tot} of 0.12 that is 88% rejection, a figure almost twice as good as the best solar glazing without shading.

There are two types of ventilated facades:

3.1. NATURALLY VENTILATED FAÇADES

These are composed of an external single layer of glass and an internal double glazing unit. The cavity between the two skins is naturally ventilated with outdoor air which comes up through the base of the glazing and returns to the outside at the top.

3.2 MECHANICALLY VENTILATED FAÇADES

These are composed of an external insulating glazing unit and an internal single layer of glass. The cavity between the two skins is ventilated with the returned room air extracted from the room at the base of the glazing and returned to the air-handling unit at the top.

4.0 THE IMPORTANCE OF SHADING

As glazing is a static element in a building, it cannot adjust to the dynamics of the weather and to the building loads and its users. Shading is dynamic and can be adjusted to provide the best possible internal environment and significantly reduces heating and cooling costs at the same time.

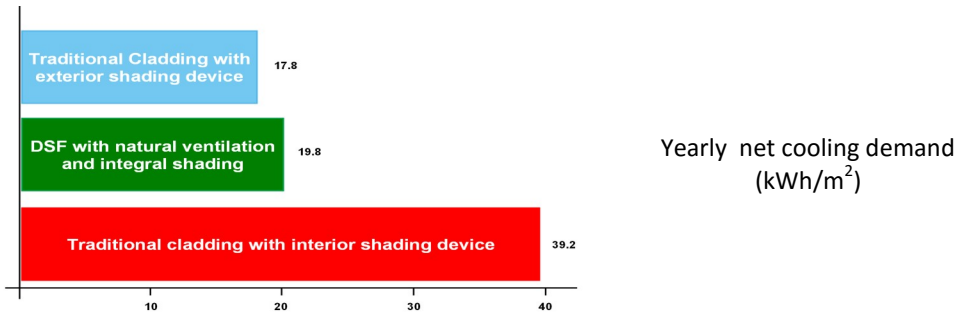
There is a growing imperative to improve building efficiency and sustainability whether that arises from a regulation, cost, corporate social responsibility stand point or possibly all of the above.

5.0 THE PROOF OF THE SHADING

The Federation of European Heating, Ventilation and Air-Conditioning Associations (REHVA) has produced a guidebook 'How to integrate solar shading in sustainable buildings'. This shows that when the correct ventilation strategy is used, a blind placed between the outer and inner glazing of a DSF will have a similar effect in solar energy reduction as an external shading. This resolves the issue of interruption of the external appearance of the clean glazing lines and removes any weather protection concerns, enabling the shading systems to be functional throughout the year.

The graph below shows that a DSF with integral blinds has almost the same net cooling demand as a standard façade with an external shading system. It also illustrates that a traditional façade with a traditional internal blind typically has a much higher cooling demand.

Simulated annual cooling demand for a typical office



6.0 FURTHER INFORMATION

For more information including scientific reports, guidance notes and videos, visit the resources section of the BBSA's Shade IT website - www.shadeit.org.uk.