

**Technical Note No. 4**  
**ISSUES RELATING TO WIND LOADING ON TALL BUILDINGS**



*This Technical Note is one of five on wind loading for the window and cladding industry. The series comprises:*

- TN 2 Introduction to wind loading on cladding*
- TN 3 Wind loading on wall cladding and windows of low-rise buildings*
- TN 4 Issues relating to wind loading on tall buildings*
- TN 5 Wind tunnel testing*
- TN 6 Pressure equalisation*

### **Introduction**

Understanding the action of wind around buildings is of prime importance to the structural engineer. This technical note highlights the common phenomena of wind action on tall buildings, many of which can also arise (to a lesser extent) with low-rise buildings.

The flow of wind is subject to marked variations in speed and direction, and is further modified by the roughness of the Earth's surface. It is this disordered flow which must be interpreted by structural engineers for the purpose of design. This can be very difficult for large structures and, hence, wind tunnel tests may provide the only rational way of predicting unusual wind effects around buildings in advance of construction. Further guidance on wind tunnel tests is given in technical note TN 5 *Wind Tunnel Testing*.

Wind action on tall buildings needs to be considered at an early stage of the design so that the size and form of the structure can be optimised to capitalise on the possibilities of reducing wind loads. If the effects of wind loads are considered after the size and form are fixed then there is less scope for reductions and only smaller improvements can be achieved by use of local features. The optimal form for minimising wind loads will depend on the aspect ratio of the structure,

that is, whether it is a low- or high-rise building.

The effects of the air flow and wind pressure around and through the building during construction also need to be considered at the design stage. The designer must consider:

- The time and period of construction;
- The construction procedure to minimise excessive wind loading on the structural elements of the building during construction;
- The effect that wind loading will have on structural members and components during construction;
- The effects that the structure will have on the local wind speeds around the site and on the surrounding environment.

### **Flow of air around tall buildings**

The most common types of air flow around buildings that need to be accounted for during and after construction are categorised as:

- Down-draughts
- Separation
- Vortices
- Funnelling
- Wakes