Technical Note No 56

Accommodation of structural movement

This Technical Note is one of a series of three describing the design and assessment of supporting structures and cladding systems to ensure that building envelopes are serviceable throughout their design life. The series comprises:

TN 55 Movement accommodation in building envelopes
TN 56 Accommodation of structural movement
TN 57 Cladding movement

This Technical Note should be read in conjunction with:

TN 14 Curtain walling types
TN 30 Cladding of buildings subject to earthquakes

Introduction

Building envelopes have to accommodate movement of their components and of the supporting structure. Building structures have to be sufficiently stiff to make this possible. This Technical Note describes the ability of building envelopes to accommodate structural movements and the issues of reconciling calculated and actual movement.

Structural codes

Structural engineers design and analyse largely on the basis of design codes. These give requirements for strength and serviceability (deflection).

Many structures are designed for strength and a check is made that the deflections are acceptable. With larger floor spans and lighter forms of construction it is increasingly necessary to design for serviceability and check that the strength is acceptable.

The structural design codes give default deflection limits to be used in the absence of deflection limits agreed between the structural engineer and client. The default values are for generic forms of construction such as beams carrying brittle finishes. No mention is made of supporting cladding.

The deflection limits may be relaxed when designing industrial buildings. However, many forms of building envelope will require that the deflection limits are tighter than the code default values.

Structural Engineers design to the codes listed in the bibliography.

Calculated and actual structural movements

Actual deflections are often less than the deflections calculated by structural engineers for the following reasons:

- The Structural Engineer may simply check that deflections are within the code limits rather than calculate the actual values.
- The Structural Engineer may use simplified calculation methods.
- Structural calculations omit additional stiffening from secondary elements such as infill walls and staircases.
- Design loads are conservative and will rarely be achieved.