

Movement accommodation in building envelopes

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 also be read in conjunction with:

*TN 20 Design of sealant joints
TN 21 Tolerance, fit and appearance of cladding
TN 60 Performance of externally rendered cladding systems*

Introduction

This Technical Note describes the need to design building envelopes and supporting structures such that the building envelope is not subject to inappropriate movement that may cause failure of the envelope. It also describes the principal mechanisms that allow movement of the cladding.

Non-loadbearing building envelopes have to be isolated from movement of the supporting structure so that they do not resist structural movement, which may induce loads in them for which they have not been designed.

Expansion and contraction of components has to be accommodated by allowing movement to occur at component joints otherwise unintended internal stresses are generated.

Failure to design for this movement can lead to fracture or buckling of components. Even if the structural and cladding movements are not large enough to load the façade components to failure, they may reduce the gaps required for drainage.

All envelope systems should be designed to accommodate their own movement and some structural movement. The movement accommodation of a building envelope system will depend on its detailed design. For instance a stick system based on a 60mm wide transom will accommodate greater floor deflections than one based on a 50mm wide transom.

Increasingly structural engineers are required to undertake detailed design work and provide statements on structural movement before the façade details have been finalised. Prior to the latter, structural engineers tend to work to deflection limits set by structural codes without taking due regard of the structural deflection limits that curtain walling systems can accommodate.

Technical Notes 56 and 57 provide an introduction to movement accommodation in building envelopes. This includes guidance for structural engineers to enable them to undertake a preliminary assessment of the structural deflections that the building envelope may accommodate once a decision has been made on the type of non-load bearing