Technical Note No. 26

INTRODUCTION TO STRUCTURAL DESIGN OF STICK CURTAIN WALLING

Introduction

Curtain walling is not generally expected to act as a structural element of the building; it is only required to support its own weight, wind loads and horizontal live loads arising from use of the building. It must be able to transfer these loads to the main structural frame of the building. This Technical Note describes the structural design procedures that may be used to ensure that the curtain wall can carry these loads without impairing the safety or serviceability of the structure.

Curtain walling

The primary structural elements of a stick curtain walling system are vertical mullions, which run the full height of the cladding. They are normally supplied in one or two storey lengths, which are connected by sleeved joints. These joints are usually designed to permit vertical movements and allow transfer of shear loads but do not transmit axial loads or moments. Mullions are typically spaced at between 1.0 and 1.8m centres and support transoms. Transoms are connected to the mullions using angle cleats, sleeves, spigots or proprietary brackets.

The framework of mullions and transoms supports infill panels, which may be glazing units or insulated panels.

Mullions and transoms are usually made of extruded aluminium but may be steel. A number of manufacturers produce standard systems using aluminium profiles, which have been specially designed to support the infill panels with weathertight joints. Aluminium profiles are generally based on thin walled extruded box sections, which may require reinforcement to accommodate concentrated loads at fixings. Longitudinal ribs are often used to increase the wall thickness to accommodate fixing screws for mullion brackets and cross webs may be incorporated to prevent squashing of the section by bracket fixing bolts passing through the section. Enlarged fixing holes with bushes may be used to distribute concentrated loads from fixing bolts. Figure 1 shows a typical profile.

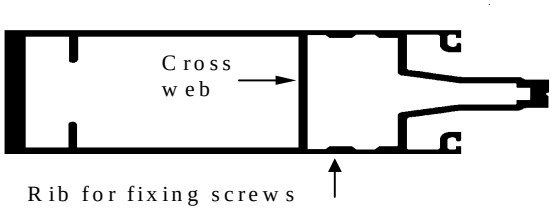

Figure 1 Section of typical curtain walling mullion

Loads

Wind is the dominant form of loading which is dependent upon site location, topography, ground roughness, building size and shape, and the number and location of openings within the building envelope. The wind pressure is calculated using the procedure in BS 6399: Part 2 or the simplified procedure in Technical Note No. 3 *Wind loading on wall cladding and windows of low-rise buildings.*

The wind load on an area of the infill panels will be a uniformly distributed load however part of this load will be transferred directly to the mullions while part will be transferred via the transoms. For approximate design purposes the load on the mullions may be assumed to be uniformly distributed but a more economical design may be obtained using the trapezoidal