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Chief Executives – Scottish Local Authorities
Copy to: Local Authority Building Standards Managers

Our ref:
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Dear Chief Executive,

BUILDING (SCOTLAND) REGULATIONS 2004, AS AMENDED STRUCTURAL DESIGN OF CLADDING SYSTEMS – WIND LOADING

I am writing to make you aware of the need to properly interrogate structural design calculations for cladding systems (including external wall insulation systems (EWI)), particularly for high rise buildings and buildings in exposed locations.

Building (Scotland) Regulations and guidance on wind loading

Regulation 9, Standard 1.1 of the Building (Scotland) Regulations 2004, as amended, states that every building must be designed and constructed in such a way that the loadings that are liable to act on it (including wind loading) will not lead to collapse of any part of the building, excessive deformations or impairment of stability of another building.

The guidance given in clause 1.1.2 of the Technical Handbooks states that the wind loadings to which the building will be subjected to should be calculated in accordance with BS EN 1991-1-4:2005 and its UK National Annex.

Wind loading calculations, and structural design of cladding systems

This letter highlights key aspects in structural design calculations for building cladding systems and assessment of those calculations. Inadequate calculations can result in cladding systems failing when exposed to anticipated peak or high wind loads, potentially resulting in parts of the cladding system detaching from the building.

On high rise buildings in particular, this can give rise to life safety risks.

It is therefore important that local authority verifiers consider how the following are taken into account as part of their assessment of structural design for those responsible for designing and installing the system

- Designed system must be demonstrated to be capable of resisting the calculated wind loading.
- Insulation to render bond strength must be adequately considered in render systems.
- Design pull-through values must be considered and used appropriately.
- Fixing numbers / pattern must be correctly specified and defined.
- Design pull out value must be correctly calculated at all levels of the building.
- The correct safety factors must be applied as set out in relation to the specific system being used.
- Methodology for installation and design must be clearly expressed.
- Sufficient detail of the building and its site context need to be available.

- Sufficient data should be available to enable a detailed assessment to be carried out.
- Consideration should be given to the need for detailed site survey to be undertaken including specific pull out and / or adhesion tests.
- Wind pressure zones on the building must be adequately described.
- Care should be taken to avoid calculation errors resulting in over engineering of the system (which can cause failure e.g. where pull out zones overlap).

Failure to properly take into account these factors can mean that the safety factors used during calculation and design to meet anticipated wind loads can be significantly eroded or, in some cases, reduced to zero. Where safety factors are marginalised, only a perfectly installed system will be likely to resist predictable peak wind loads.

This leads to an increased risk of render systems (of any type of cladding) delaminating or falling from the building. Debris falling from height could pose a substantial risk to life safety. Buildings over 15 storeys, and over 6 storeys in areas of high exposure, are likely to be particularly vulnerable if design calculations are inadequate.

It is therefore particularly important that;

1. Design calculations are undertaken by a competent designer in accordance with the guidance in Section 1 Structure of the Technical Handbooks or SER Certification supported by a fully detailed engineering specification as detailed under the specification and certification documentation.
2. The structural design of cladding systems is rigorously checked by a suitably qualified person.
3. The specific site conditions and nature of the building are fully understood and factored into calculations.
4. Where necessary site tests are undertaken to assess design pull out and adhesion strength underpinning design assumptions.
5. There is adequate site inspection to ensure that the system is installed in line with the design.

Certification of Design (Building Structures)

An alternative to the local authority verifying the structural design of the system is for the building owner or developer to employ an Approved Certifier of Design (Building Structures) to certify the design.

The certification system is based on the principle that suitably qualified and experienced building professionals and tradesmen can be responsible for ensuring that specified works comply with building regulations. A scheme for the Certification of Design (Building Structures) is operated by Structural Engineers Registration Ltd (SER), a trading subsidiary of The Institution of Structural Engineers.

Under this scheme the Approved Certifier will certify that the cladding system as designed will comply with Regulation 9, Standard 1.1 and Standard 1.2 of the Building (Scotland) Regulations, 2004, as amended, and will issue a Certificate of Design (Building Structures) to confirm this. The certificate of design is taken as proof of what it purports to cover and the verifier does not check those matters.

Local authority verifiers will also be aware that Local Authority Building Standards Scotland (LABSS) have prepared an information paper for designers of External Wall Insulation for [Designers](#) (INFOP05/2015) EWI. However verifiers should still ensure that there is adequate site inspection to ensure that the system is installed and constructed in accordance with the design.

Yours sincerely



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