

Advice for building owners: External Wall Insulation (EWI) systems with a render or brick-slip finish

This Advice Note is for the attention of anyone responsible for the maintenance of a building with External Wall Insulation (EWI) systems with either a render or brick-slip finish, particularly those over 18m tall or in an exposed location.

It has been developed in consultation with DCLG's Independent Expert Advisory Panel and the Standing Committee on Structural Safety (SCOSS).

1. It has been brought to the attention of DCLG that External Wall Insulation (EWI) systems with either a render or brick-slip finish may in some circumstances be vulnerable to deterioration, resulting in parts of the EWI system falling from buildings.
2. We are not aware of any injuries arising from these concerns but building owners should note the following information and take appropriate action to ensure the safety of their building. There is no suggestion that the overall structural safety of these buildings is compromised.

Summary

3. All EWI systems need to be designed to resist pressure from predicted wind loads in the location and at the height that they are installed. The fixing system of the EWI system must be adequately designed to deal with predicted loads, including the weight of the system itself. Guidance on how to achieve this is provided in paragraphs 3.3-3.8 of Approved Document A *Structure* of the Building Regulations www.gov.uk/government/collections/approved-documents. This includes undertaking suitable design calculations.
4. Design calculations for EWI systems typically include safety factors to ensure that even where an installation is not perfect, or in the event that unusual circumstances occur (such as high winds), the system will remain safe. This information should be available from system manufacturers. However, evidence submitted to Government suggests that in some circumstances these safety factors are being eroded by inadequate design (structural calculation methodologies) and / or poor installation.
5. Where inadequate design and / or installation reduces safety factors, EWI systems are more vulnerable to: damage from high wind speeds; other installation defects such as poor water-tightness (which can lead to insulation becoming water-logged and heavier as a result); and variations in the design and installation quality of mechanical or adhesive fixings. These potential defects increase the risk of the EWI system becoming detached from the building and falling from height. This in turn poses risks to life safety. With

render or brick-slip EWI systems there is a heightened risk of the render or brick-slip layer detaching from the insulation underneath where these defects are present.

6. We are aware of a small number of instances where inadequate design and / or inadequate installation has resulted in parts of EWI systems falling from tall buildings. Building owners should therefore consider the actions listed below.

Which buildings could be affected?

7. It is good practice to periodically check the condition of any EWI system (see note **Annex A**) on any building of any height and all building owners should consider the need to undertake such checks as part of their regular maintenance and management plan.
8. Due to the nature of the problems that have been identified, this advice is particularly relevant for tall buildings subject to high wind loading due to high wind speeds. Specifically this advice should be followed if you own a building which has an EWI system, particularly if it is over 18m tall or in an exposed location.
9. If not undertaken recently, building owners should consider an immediate audit or review of the buildings for which they are responsible to identify their height, construction, location and wind exposure. It is likely that you will need to seek expert advice from a suitably qualified person such as a Chartered Structural Engineer or Chartered Building Surveyor. A link to the relevant section of the Institute of Structural Engineers and Royal Institution of Chartered Surveyors (RICS) websites are provided below:
www.istructe.org/finding-a-structural-engineer/notice-to-building-owners
www.ricsfirms.com
10. There is no prescribed definition of an exposed location but typically this would include buildings in an elevated or hill-top location, sea side locations, areas where the surrounding terrain will not provide sheltering from wind, or a combination of these factors. In dense cities, funnelling will need to be considered, which could increase the wind effect.

New External Wall Insulation installations

11. In order to ensure risks are mitigated in future installation the Government has written to all Building Control Bodies and all certification schemes for EWI systems to highlight the need to ensure adequacy of structural design and installation in accordance with the requirements of the Building Regulations – the relevant circular letter can be found at the link below:
www.gov.uk/government/publications/wind-loading-calculation-for-cladding

Existing External Wall Insulation system with a render or brick-slip finish

12. Steps also need to be taken to assess existing installations. It is recommended that for relevant buildings, assessment should be undertaken to reassure building owners of the structural integrity of their EWI systems. Visual condition inspections may still be advisable for owners of buildings of any height with an EWI system (see below).
13. In general, the key steps for building owners are as follows (further guidance is provided at Annex A), however building owners should also take their own professional advice:
 - Undertake a visual recorded survey of EWI system condition, including checking that waterproofing is adequate and that the system is not absorbing moisture (which can increase risk of structural failure). EWI systems are likely to fail gradually rather than catastrophically, meaning that ongoing visual inspection will also be important in identifying any at risk EWI systems in the longer term.
 - Obtain design records, construction details, structural calculations, specifications, system certification for the EWI system, and appoint suitable expert advisors to assess the adequacy of the design and installation.
 - On the basis of both of the above, establish what further non-invasive or invasive investigations are needed to confirm that the EWI system is installed in a way which can safely resist all likely actions, including wind-loads and dead loads.
 - If necessary, commission remedial work to address inadequacies in the design or installation of the EWI system. Also consider mitigating measures to protect people moving around the outside of the building until remedial work is complete.
 - Consider what ongoing inspection regime is advisable.
14. Government is working with the Independent Expert Advisory Panel and the Standing Committee on Structural Safety (SCOSS) and in co-ordination with the devolved administrations to assess whether further guidance on the structural design, installation and maintenance of EWI systems is necessary.

Maintenance and alterations

15. Building owners with an EWI system with a render or brick-slip finish also need to review procedures for making alterations or additions to walls where this involves fixing to or making holes in the surface. Maintenance manuals for EWI systems should provide further detail on specific considerations in relation to each type of system.
16. In general, wherever work is undertaken, care must be taken to ensure that fixings or penetrations (such as fixings for a satellite dish, hanging basket,

washing line or penetrations for cables or pipes) are sealed with a durable finish and do not permit water to enter into the EWI system.

Next steps

17. We have written to all local authorities and housing associations. We will also write to organisations representing private sector building owners. Local authorities should also consider circulating this advice to other tall building owners in their area.
18. Where building owners identify that their building may have inadequate design or poor installation of EWI systems, they are invited to contact the tower case work team towercaseworkteam@communities.gsi.gov.uk so that the issues can be logged.

Annex A: Visual inspection and condition survey of External Wall Insulation (EWI) systems with a render or brick-slip finish

1. This annex provides initial advice on considerations in undertaking a visual condition survey of External Wall Insulation (EWI) systems with a render or brick-slip finish. This guidance is not comprehensive, and you should consider seeking expert professional advice from a suitably qualified professional such as a Chartered Structural or Façade Engineer, or Chartered Building Surveyor.

What is a visual condition survey? How is this done?

2. A visual condition survey is a non-intrusive inspection of the key elements of the rendered EWI system to assess whether there is any deterioration that could lead to the system failing in some way.
3. As a first step, you should obtain inspection and maintenance guidance information from the manufacturer/installer for the specific EWI system that has been used on your building. This will normally provide advice on how often visual inspections should be undertaken and key features to look for. If you already have regular inspections undertaken of the building, you should obtain the inspection records and review these.
4. The type and frequency of all inspections should be as advised by the system manufacturer/approved installer. Typically visual checks should be undertaken on at least an annual basis, encompass a full review of the exterior and a representative sample of key junctions and features. Increasingly drones with high fidelity cameras, thermal imaging and other sensor packages are available to undertake this type of work. It is generally considered good practice for a full condition survey by a suitably qualified professional to be undertaken at least every ten years.
5. Due to the fact that a visual survey of the EWI system might not identify the potential for wet insulation or insufficient fixings, an intrusive inspection should be considered. However, initial steps may include those listed below.

General

6. Access via a cherry picker, Mobile Extendable Working Platform (MEWP) or local portable scaffolding might be required to provide a safe work environment (consideration should be given to relevant requirements of the Construction Design and Management (CDM) regulations: www.hse.gov.uk/construction/cdm/2015/index.htm).

Inspection

7. Inspection sequence (staged as required):

- a. Identify manufacturers (markings/signage/stickers etc.), consult building manuals, and operation and maintenance documentation.
 - b. Inspect externally for wet patches or discolouration of the finish.
 - c. Inspect for any cracks or gaps at junctions in the finish that could let rainwater in, ideally investigate width and depth of the cracks using a crack width ruler.
 - d. Consider using special infrared thermographic camera (mid to high resolution) equipment that might show insufficient insulation or wet insulation. The temperature difference between inside and outside would require ideally to be 20° Kelvin. Hence this assessment is generally best performed during winter months.
8. If necessary to undertake intrusive investigations, you should seek professional advice on a case by case basis but this might include:
- a. Identify/select randomly approximately 10% of the EWI system for intrusive survey via micro-invasive access, endoscopic equipment and sample extraction, which shall be sealed afterwards adequately.
 - b. Extract a core sample of the build-up (~50mm diameter and full depth of the EWI system); store in adequately sealed container; and submit for examination by specialist sub-contractor.

What is a visual condition survey looking to identify?

9. EWI systems need to remain watertight in order to avoid water penetrating behind the render layer. This can cause failure in a number of ways including by making the insulation layer heavier; by weakening the bond between the render/brick-slips and insulation (or insulation and substrate) or spalling caused by freezing of rain water.
10. There are also a number of other common indicators that the EWI system is failing or has problems which might – for instance – indicate inadequate fixings, excessive wear and tear caused by repeated exposure to wind loads, or differential movement in the underlying structure that has not been accounted for in the design of the system.

11. A visual inspection will typically be looking for common features such as:
- Cracking of render allowing water penetration or suggesting underlying movement.
 - Brick slips or render falling away from the insulation.
 - Cracking or deterioration of seals at junctions between the EWI system and adjacent features such as windows, doors, service penetrations etc. Deterioration could allow water to penetrate into the EWI system.
 - Damaged or incomplete waterproofing e.g. damaged or missing copings, cappings or seals that could allow water to penetrate into the EWI system.
 - Spalling – where small pieces of render are falling from the EWI system.
 - Blowing – bulges or distortions in the render finish indicating that it has pulled away from the underlying insulation, often confirmed by tapping giving a hollow sound compared to other areas of non-blown render.
 - Bubbling – groups of bubbles under the surface of the render finish, which can be indicative of water penetration.
 - Effervescence – effervescence often manifests as salt staining due to the migration of salts from the substrate into the finish, and can be indicative of water penetration in the insulation / substrate.
 - Mould – on the inside of external walls.
12. The above list is not exhaustive and you should seek further professional advice as necessary. All necessary health and safety precautions should be followed when undertaking a visual inspection, particularly when working at height. A full risk assessment will be necessary in accordance with the requirements of the current Construction Design and Management (CDM) Regulations and advice notes from the Health and Safety Executive.

What should I do if I identify problems / defects?

13. You should contact the original system manufacturer for advice and assistance, and to obtain guidance on how to undertake any necessary repairs to the EWI system. You may also need to expert professional advice from a suitably qualified professional such as a Chartered Structural or Façade or Building Engineer in order to be able to interpret the extent to which any defects or damage may give rise to a risk of any part of the EWI system failing.
14. You may want to consider contacting the installer and notify them of the suspected faults/defects, before any remedial works are carried out. You should consider taking independent legal advice prior to undertaking any remedial actions, particularly in relation to your position with regard to latent defects and warranty provision.

15. If you are unable to contact the original installer, you may want to contact the Insulated Render and Cladding Association (www.inca-ltd.org.uk/) or the British Board of Agrément (www.bbacerts.co.uk/)¹ for further advice.
16. If you believe there is any imminent danger of parts of the EWI system falling from the building you should contact your Local Authority Building Control Body, who have a duty to advise on dangerous structures. Residents inside the building are unlikely to be at any increased risk but you should immediately consider what mitigation measures are necessary to protect people moving around the exterior of the building (including on balconies), such as controlling movement or access in the immediate vicinity below the area of EWI system that is of concern.
17. You should then consider:
 - What further non-intrusive or intrusive investigations are needed.
 - Whether repairs or remedial works are necessary.
 - What further advice is required on how to proceed.

¹ Updated 4 January 2018