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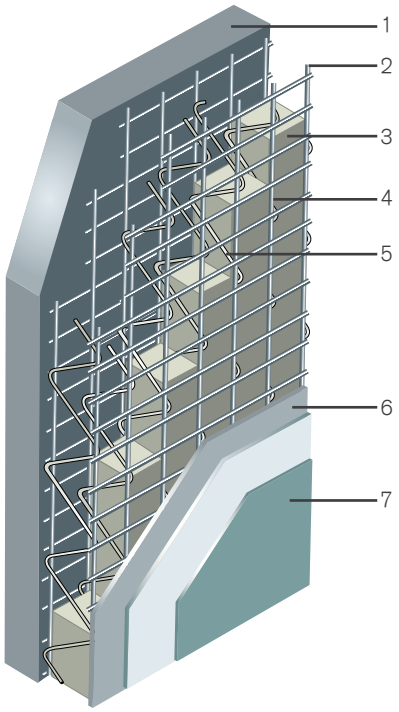
Structural External Wall Insulation System Overview & Benefits

Structural External Wall Insulation

Diagram 1
Structural External Wall Insulation - typical sequence of layers



1. Substrate
2. Steel welded wire "cage"
3. Rigid insulation core
4. Vertical and horizontal wires
5. Warren trusses
6. Basecoat render
7. Finish

System Overview

Structherm's unique Structural External Wall Insulation system is a cost effective method of extending the life of defective buildings whilst also improving the appearance and thermal efficiency.

The system can be used to refurbish buildings in the following sectors:

- Non-traditional Low Rise Housing
- Prefabricated Reinforced Concrete (PRC) Housing
- Medium and High Rise Buildings
- System Built Schools

The system is based on the performance of a unique, two-way spanning, lightweight prefabricated panel component with a rigid insulation core - the Structural External Wall Insulation panel. These panels are joined together with mesh to provide a rigid, continuous envelope around the building with real structural integrity.

A substantial layer of basecoat render is then applied to the system which works with the panels to provide a high degree of spanning / racking strength.

To complete the system a wide choice of final render finishes, colours and textures are available. This finished layer of render provides an attractive façade that fully meets the client's aesthetic expectations, please refer to our Renders and Finishes Datasheets.

Approvals

The Structural External Wall Insulation panel is a unique patented system. No other system is able to provide the structural benefits that the Structherm system offers and it is the only structural cladding system to carry a BBA Certificate.

BBA BRITISH BOARD OF AGRÉMENT
CERTIFICATE No 03/4022

Refurbishment Programmes Can Include:

1. The overcladding of defective or inefficient system built structures to improve their structural and thermal performance, and their overall appearance.

2. Reconfiguring property façades such as reduction of glazed areas and window replacement (modifying solar gain, heat loss and glare).

3. Enclosing balconies or walkways to increase internal floor area for residents. Particularly useful when balconies are infested with roosting pigeons, and an extremely popular choice amongst residents.

4. Re-modelling of parapet / gables to increase safety and transform the skyline, an important factor for some Local Authorities as these buildings can often be seen for miles around and can improve the image of the whole surrounding area.

System Benefits

The unique characteristics of Structherm's Structural External Wall Insulation system offers many benefits:

1. Structural improvement

Stabilises defective walls and provides real structural integrity therefore providing a viable alternatives to demolition.

2. Thermal performance

Significantly improves the thermal efficiency of buildings, thereby reducing fuel consumption and CO_2 emissions.

3. BBA certification

Backed by full BBA Certification (No. 03/4022) confirming that the product has a minimum design life of 30 years.

4. High impact resistance

Impact resistance of 10 N/m has been attained, therefore less damage from vandalism.

5. Easy handling

The panels are immensely strong yet lightweight which means they are easily handled by one person, and can be cut on site to suit complicated configurations.

6. Acoustic performance

Transmission of external airborne noise is much reduced using the system.

7. Insulants

Four standard insulants are available giving a range of thermal performance figures to suit any application. Current building regulation U-values can be met or exceeded.

8. Renders and surface finishes

The external render face offers a high level of weather protection and is virtually maintenance free.

9. Moisture

In addition to their water resistant properties, renders are also vapour permeable to allow natural drying of existing walls.

10. Condensation

Eliminates cold bridging and interstitial condensation by providing a "breathing wall" façade solution.

Resident Benefits

1. Minimising disruption

Work is mainly carried out externally thus minimising disruption to residents.

2. No temporary relocation

No need for residents to relocate during the work, they can remain in their homes.

3. Financial reward

Improvements in thermal performance result in lower energy bills, also helping to reduce fuel poverty.

4. Less noise

Lower levels of noise from outside due to improved acoustics.

5. Healthier environment

Healthier living environment with less cold, draughts and condensation.

6. Aesthetics

External appearance of whole streets transformed.

7. Pride

Communities brought together rather than torn apart and pride restored.

Boswell properties refurbished by Liverpool Mutual Homes using Structural External Wall Insulation.

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Structural External Wall Insulation Standard Details & Fixing Methods

Structural External Wall Insulation

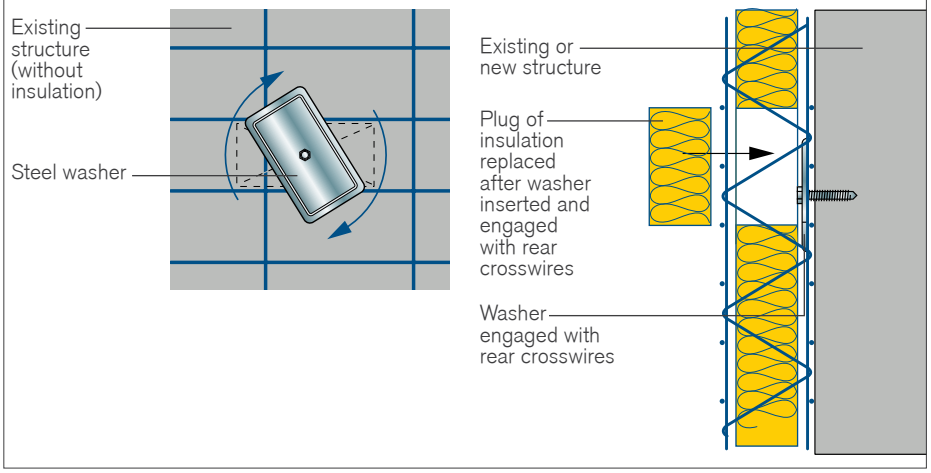
There are many ways of fixing the Structural External Wall Insulation panels depending on the substrate. The following texts and diagrams show some of these methods.

Method of fixing the panels direct to a building structure

The Structural External Wall Insulation panels use a primary fixing technique where each panel is fixed to the building structure from the rear of the panel and behind the insulation. The structural fixings, as a result, are fully embedded in the structure and therefore not subjected to short cantilever forces and the increased risk of shear failure. Because the fixings are remote from the panel surface, they will not induce stresses in the rendered finish.

The panels are offered up to the required position and small plugs of insulant are removed from the panel at the fixing points. Each fixing, complete with its large rectangular washer, is inserted into the hole and fixed to the existing structure. The washer is engaged across the horizontal and vertical crosswires at the rear of each panel. After this fixing procedure is complete, the plugs of insulant are replaced.

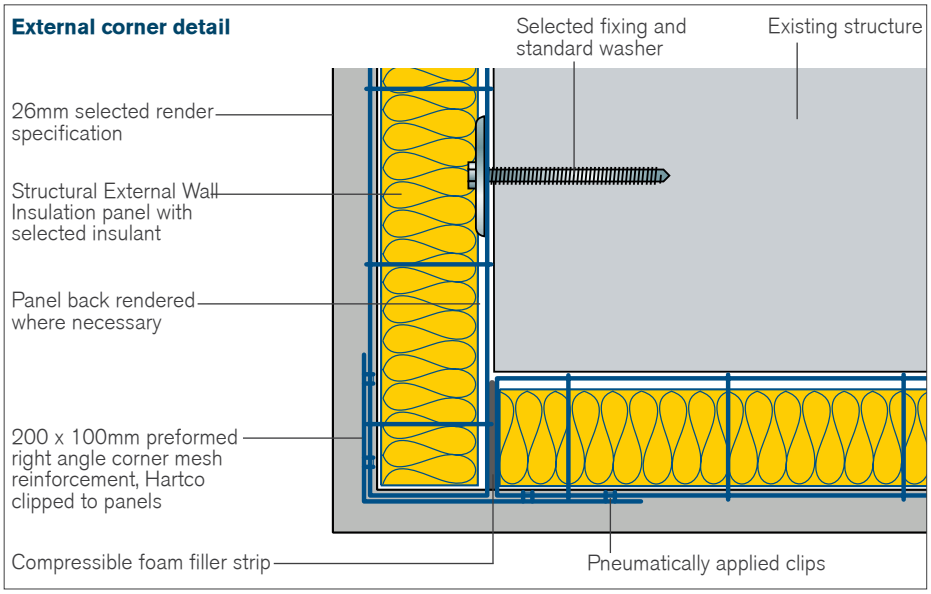
Primary fixing method



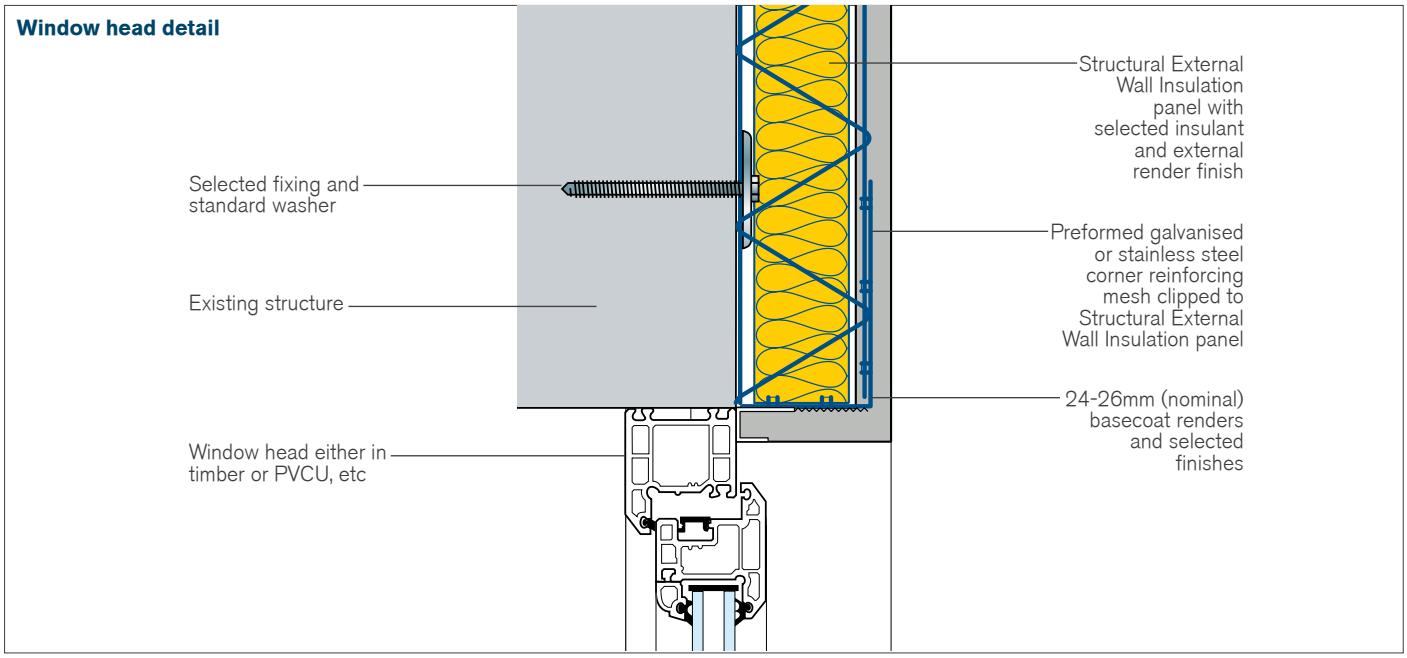
Typical panel fixing details

The Structural External Wall Insulation panels can easily accommodate openings in existing walls and changes in wall direction. Illustrated below is a typical external corner detail and overleaf a typical window head detail.

External corner detail



Window head detail



Method of fixing for the overcladding of existing panels

When the Structural External Wall Insulation Panels are used as overcladding, secondary fixings may be used to anchor into existing cladding panels as a means of providing additional restraint, provided that the condition of the panels is suitable. The secondary fixings, however, do not contribute to the performance of the Structural External Wall Insulation Panels because they are designed to span from column to column or beam to beam and transmit all imposed wind loads into the primary fixings.

Method of mesh fixing for structural continuity

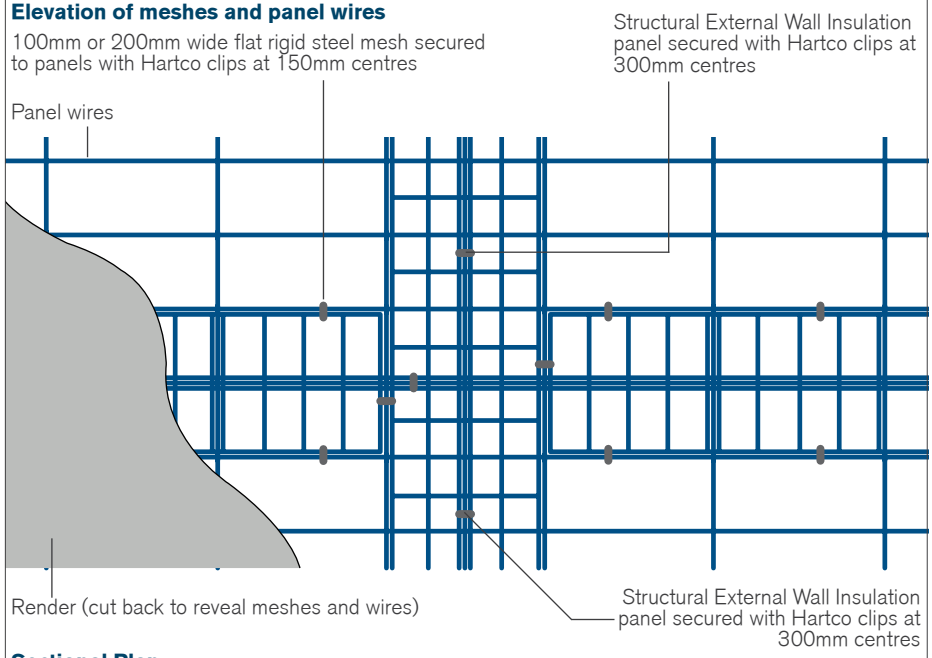
Adjacent Structural External Wall Insulation Panels are also connected to each other with cover mesh sections secured by pneumatically-applied clips providing structural continuity across the whole of the wall area. In addition, rigid angle meshes are applied vertically at corners and also around window and door reveals. These rigid angle meshes dispense with the need for exposed beads and, once rendered, ensure an unbroken, monolithic envelope to the building is achieved.

Method of finishing the panels

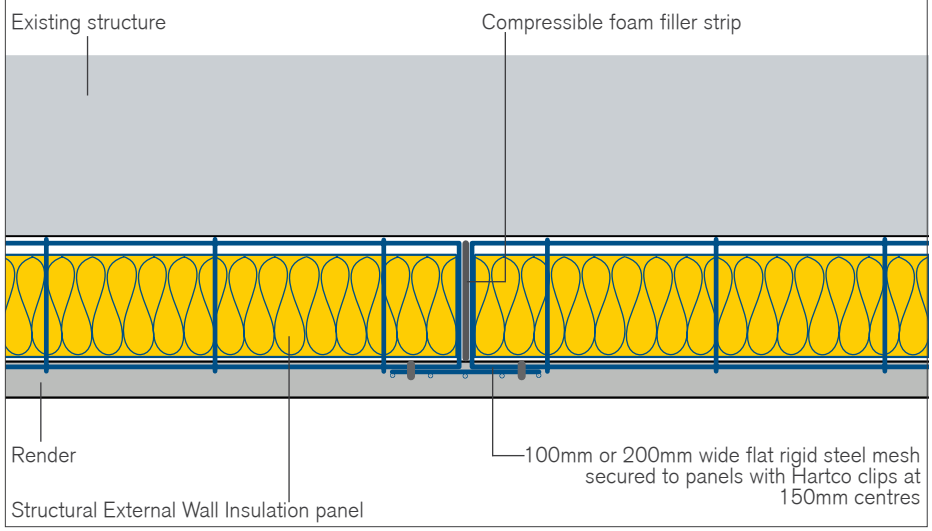
The panels are rendered insitu with a 24mm total thickness of fibre reinforced base coat and the client's choice of finishing coat (see our Renders and Finishes Datasheets). The panels are finished at the base with an epoxy powder coated, galvanised or stainless steel bellcast base trim, fixed back to the original substrate.

Mesh fixing method for panel joint reinforcement

Elevation of meshes and panel wires



Sectional Plan



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Structural External Wall Insulation

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External Refurbishment Details for Insitu Concrete Framed Non-Traditional Housing

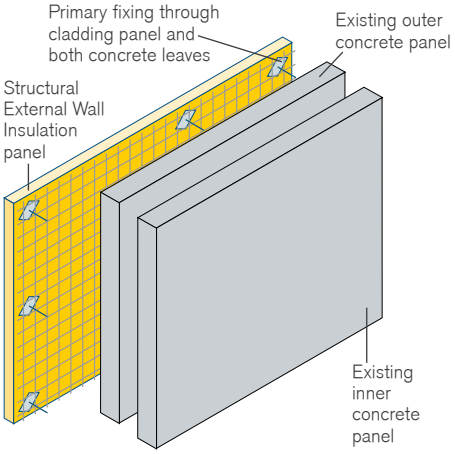
Insitu Concrete Properties

Due to the numerous construction techniques within this category there are also several different methods of fixing the Structural External Wall Insulation panels.

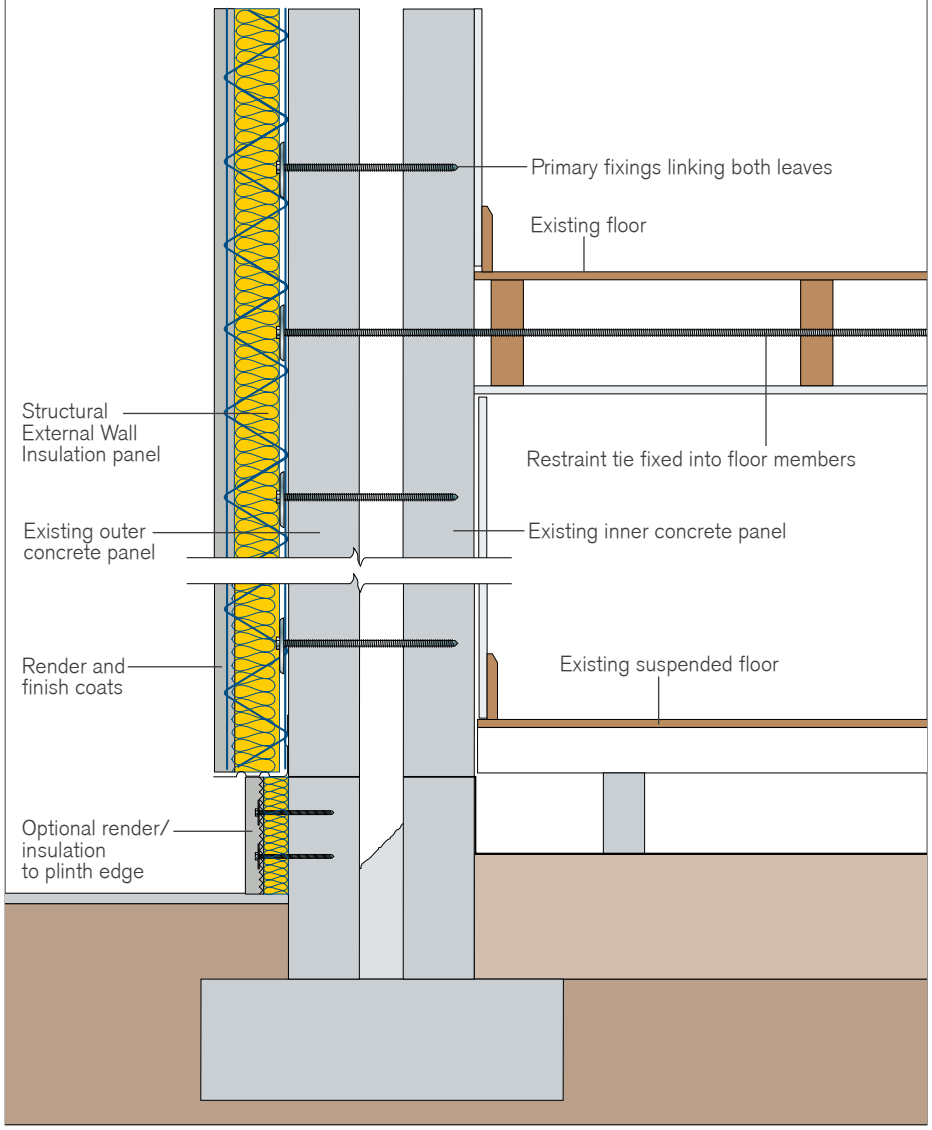
This datasheet highlights our diaphragm fixing method for properties with two insitu concrete loadbearing panels such as Easiforms. In this method the fixings are fixed into both concrete panels linking them together to provide structural stability.

This method of fixing can be applied to other properties in this category including:

- Boswell
- Duo Slab
- Unity



Typical detail showing diaphragm fixing method to Easiform concrete cavity wall property



Example of Unity Concrete Framed Properties

The primary and secondary fixing method was used to externally refurbish Unity properties for City West Housing Trust.

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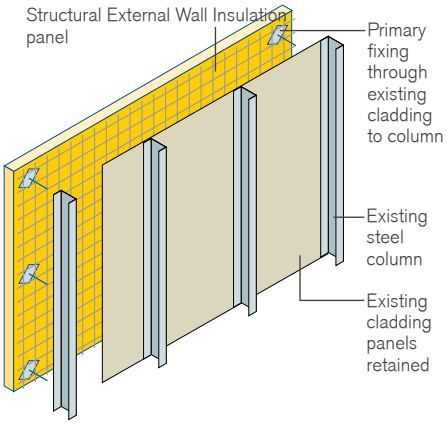
External Refurbishment Details for Steel Framed Non-Traditional Housing

Framed Properties

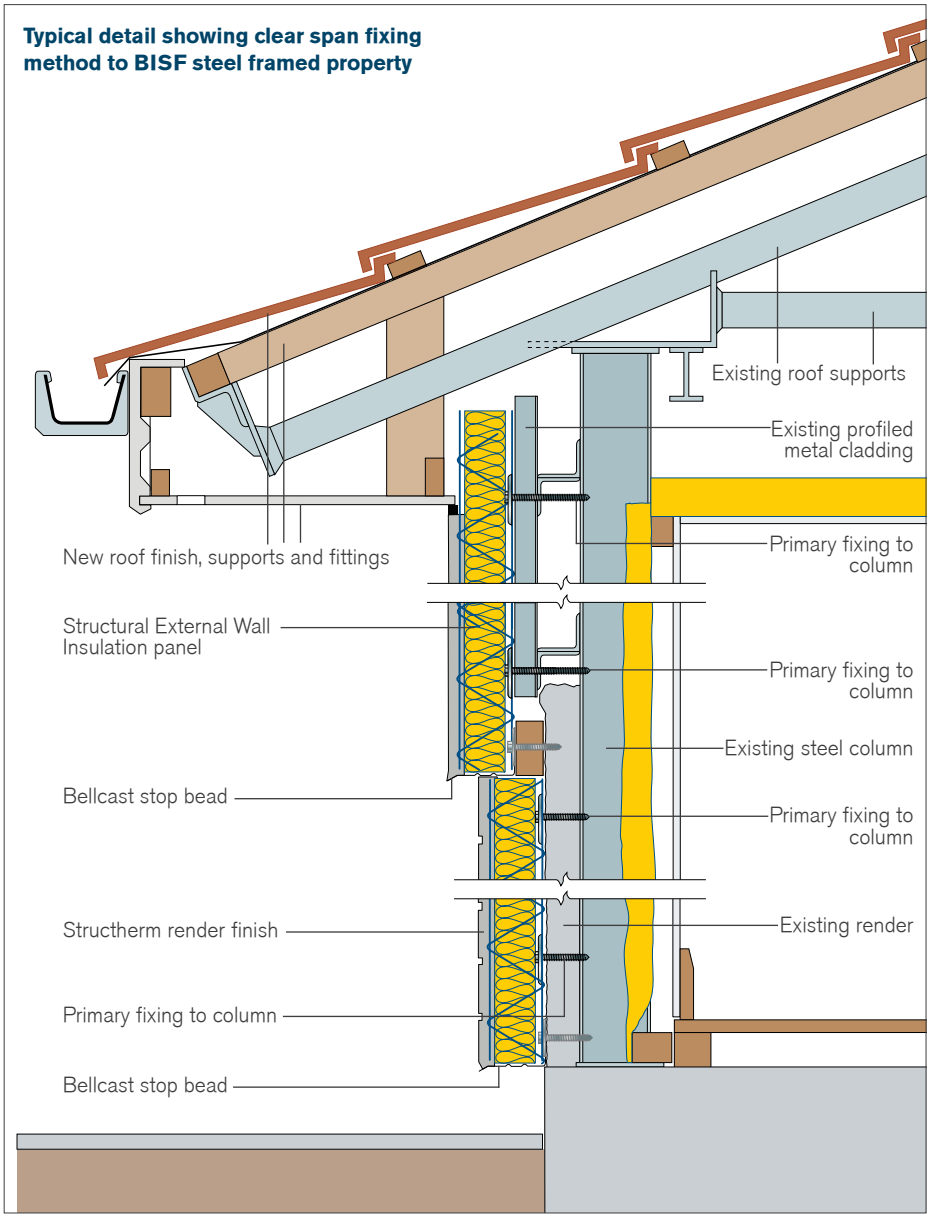
The clear span fixing method is used on loadbearing steel framed properties with non-loadbearing cladding panels such as:

- BISF
- Cussins
- Cruden
- Dorlonco

The Structural External Wall Insulation panels can span either vertically or horizontally between the steel columns. Primary fixings are fixed through the existing cladding panels and into the loadbearing steel columns.



Typical detail showing clear span fixing method to BISF steel framed property



Example of BISF Steel Framed Properties

The clear span fixing method was used to externally refurbish BISF properties for Glasgow Housing Association.

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External Refurbishment Details for Timber Framed Non-Traditional Housing

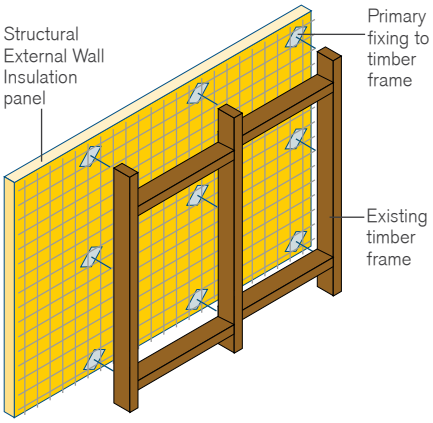
Framed Properties

The clear span fixing method is used on loadbearing timber framed properties such as:

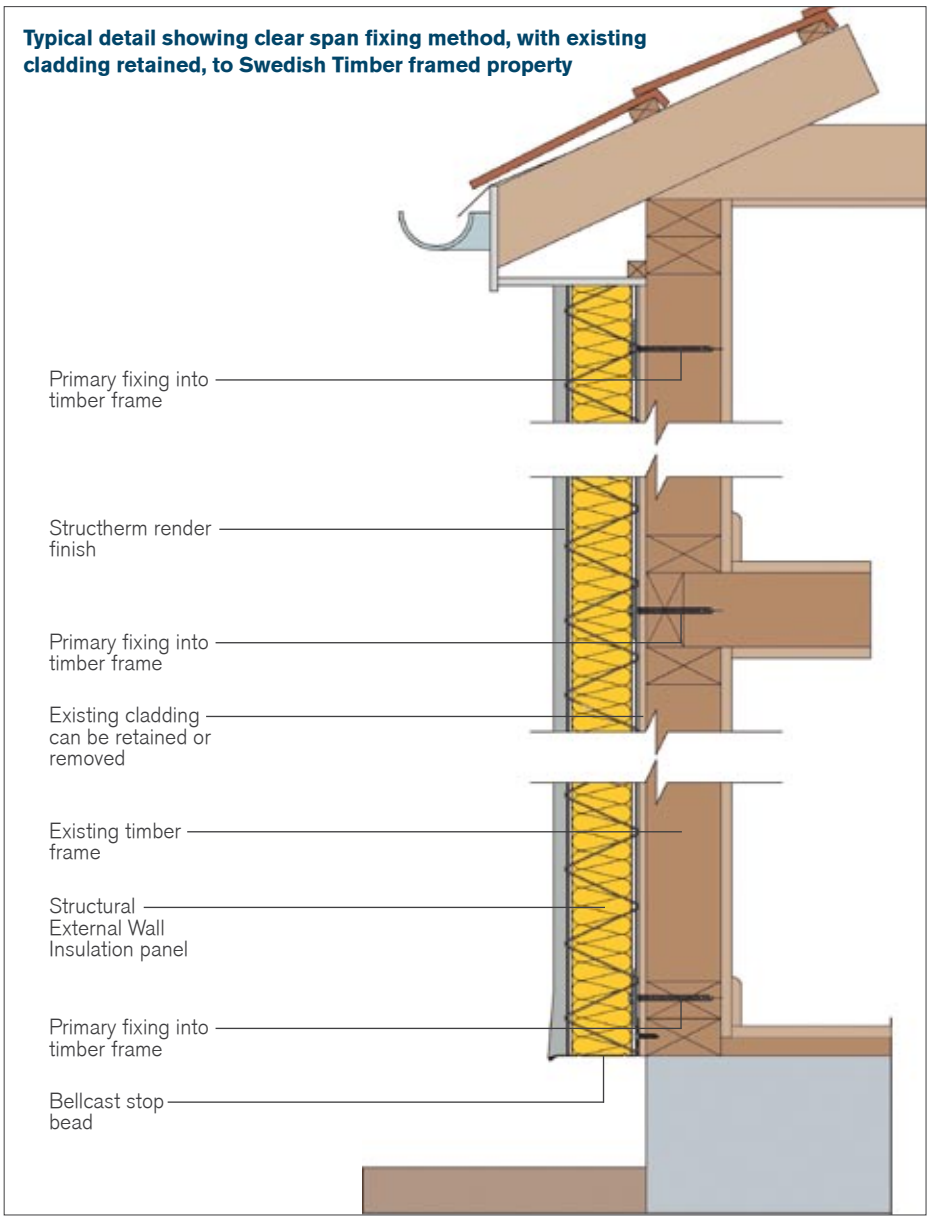
- Swedish Timber
- Calder
- Cowieson
- Weir

The Structural External Wall Insulation panels can span either vertically or horizontally between the studs. Primary fixings are fixed directly into the loadbearing frame.

Diagram below shows timber frame with existing cladding removed although it can be retained, see diagram opposite.



Typical detail showing clear span fixing method, with existing cladding retained, to Swedish Timber framed property



Example of Swedish Timber Framed Properties

The clear span fixing method was used to externally refurbish Swedish Timber properties for North Lanarkshire Council.

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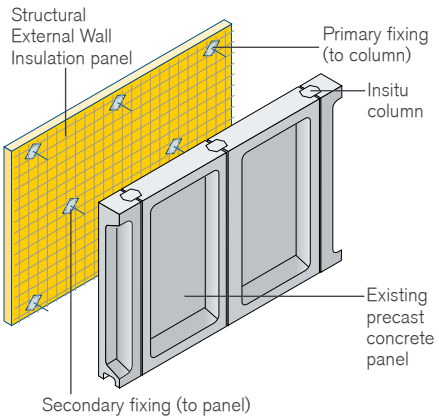
External Refurbishment Details for Precast Concrete Panel Non-Traditional Housing

Precast Concrete Panel Properties

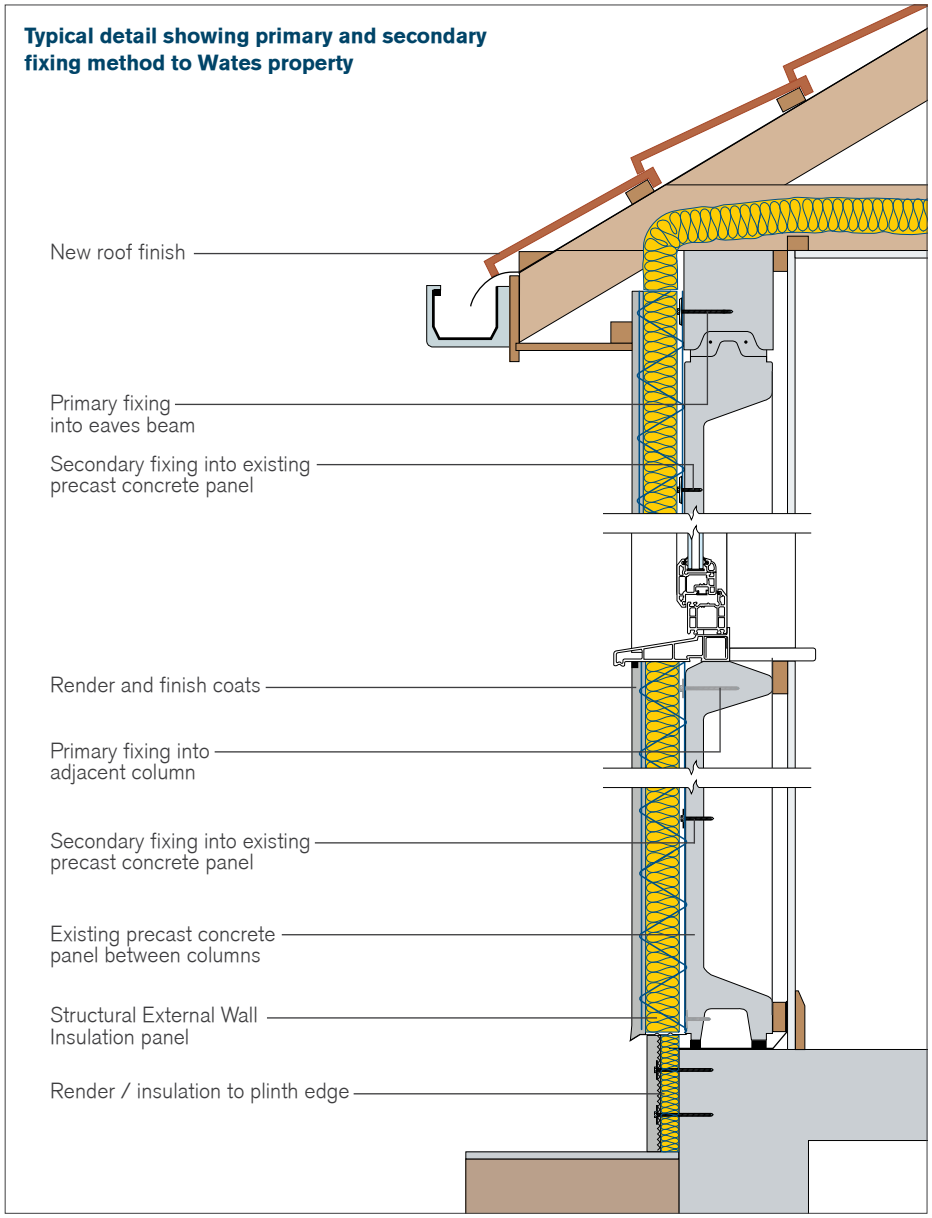
The primary and secondary fixing method is used on precast concrete properties where loadbearing is shared between the concrete columns and concrete panels such as:

- Wates
- Bison
- Orlit
- Boot

The Structural External Wall Insulation panels can span either vertically or horizontally. Primary fixings are fixed directly into the loadbearing columns and the secondary fixings are fixed into the loadbearing concrete panels.



Typical detail showing primary and secondary fixing method to Wates property



Example of Boots Precast Concrete Panel Properties

The primary and secondary fixing method was used to externally refurbish Boots properties for Liverpool Mutual Homes.

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Vertical Spanning

When a high rise block has been assessed by a structural engineer and the diagnosis is that the frame is structurally sound, but the infill material is defective then our solution is to fix the Structural External Wall Insulation panel to span from slab edge to slab edge or floor to floor.

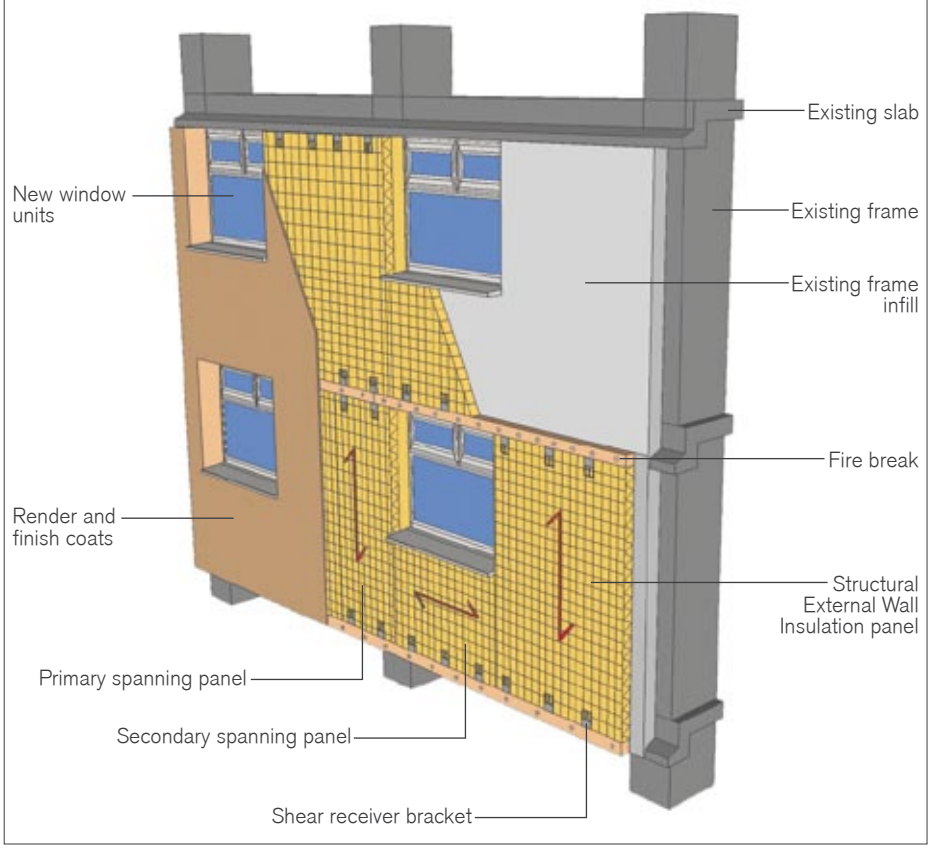
The panel is designed to be simply supported, one way spanning and works in flexure. The panel is fixed via a unique fixing bracket which allows the transfer of shear forces into the slab edge.

External Refurbishment Details for High Rise Blocks

The unique structural capabilities of the Structural External Wall Insulation allows the overcladding of defective high rise buildings as well as defective low rise housing.

Extensive testing at Loughborough University and by the BBA has shown that the panel can span in it's own right both horizontally and vertically up to 3.6 metres.

Typical detail showing fixing method for vertical panel spanning



A fire break of mineral wool is also installed at slab edges to suit the Building Regulations in England & Wales and the Technical Standards in Scotland.

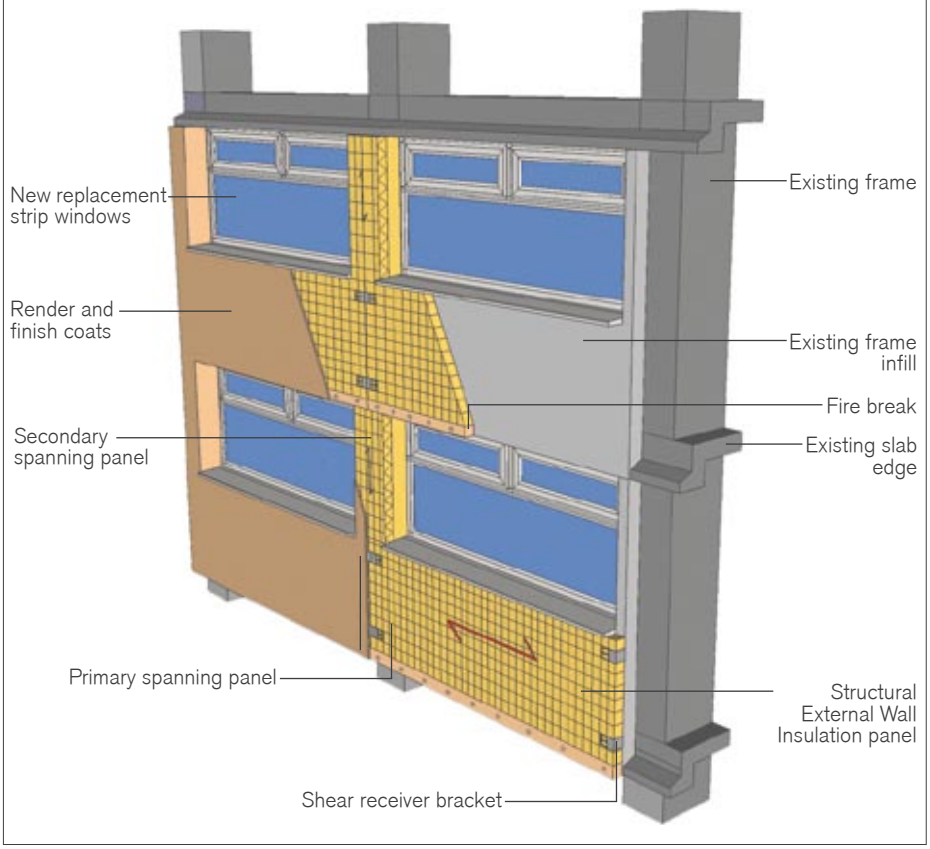
The panels strength is also assessed against the location and wind analysis to determine panel capacity, fixing type and quantity.

Structural External Wall Insulation

Horizontal Spanning

Much like the vertical spanning solution, the Structural External Wall Insulation panel can also span horizontally between structural columns. This solution is generally used where the buildings design has long strip windows which need retaining for aesthetic reasons.

Typical detail showing fixing method for horizontal panel spanning



The Structural External Wall Insulation panel works as a propped cantilever and transfers hogging through the joining mesh and uses the unique fixing bracket to transfer shear forces into the columns.

Fire breaks are installed at each floor to suit the Building Regulation in England & Wales and the Technical Standards in Scotland.

The panels strength is also assessed against the location and wind analysis to determine panel capacity, fixing type and quantity.

Balcony Enclosures

The Structural External Wall Insulation system can also be used for the enclosure of balconies on high and medium rise blocks. This is an extremely popular choice amongst residents as the enclosures increase the internal floor area of each flat.

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System Built Schools
There is a range of different solutions to choose from depending on the original type of school construction.

This datasheet highlights our facade re-configuration solution for schools which need to reduce the amount of glazed areas to improve thermal performance and reduce solar glare in classrooms.

Firstly the existing panels and windows are removed. Then a lightweight steel frame is built leaving the desired size of opening for the window above. The Structural External Wall Insulation panels are then fixed to the existing frame and the new lightweight steel frame with primary and secondary fixings.

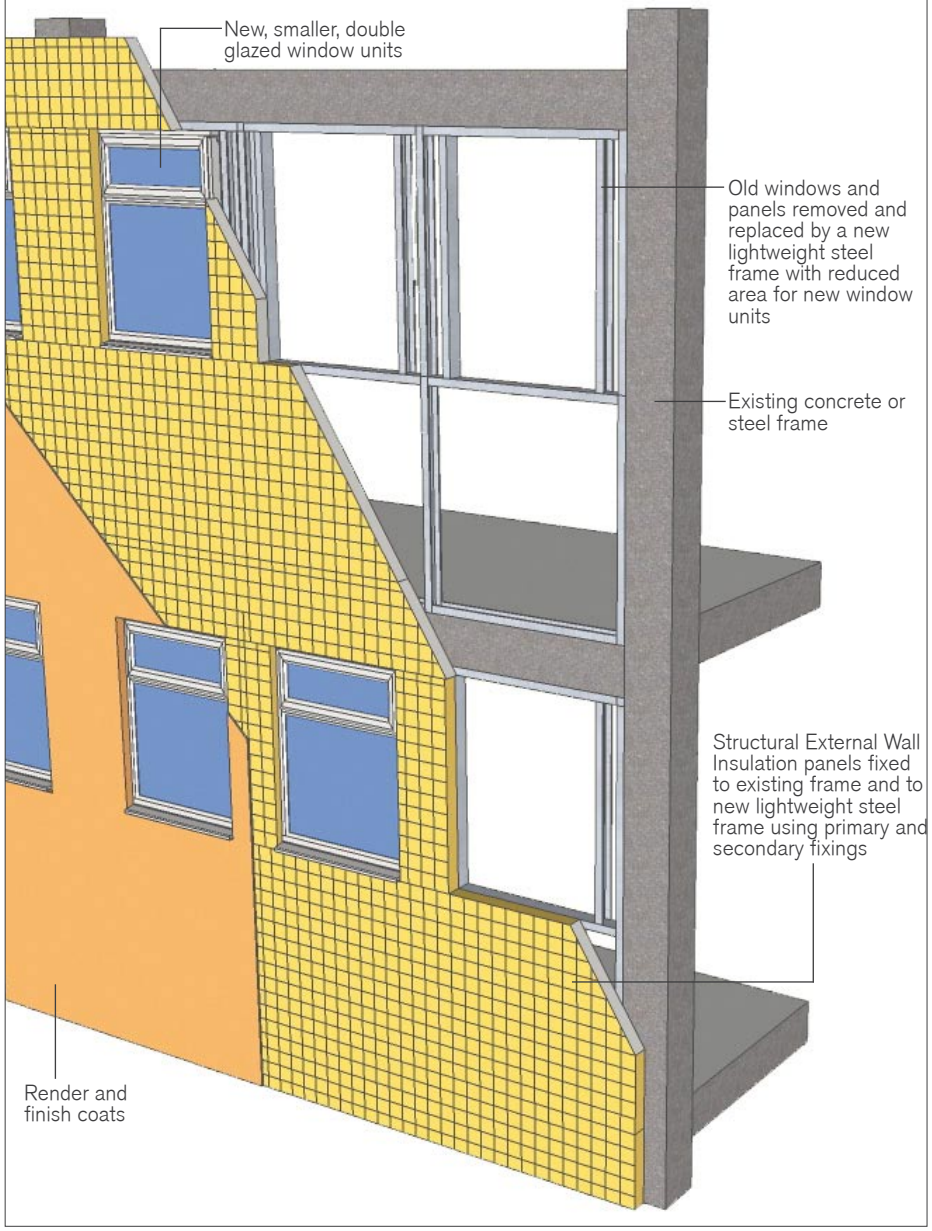
We also have other solutions, for example, where schools have defective concrete cladding panels. We can either overclad the failing panels or remove them and infill between the original steel columns.

The following are system built schools which Structherm have previously worked on:

- CLASP
- Horsa
- Scola
- Hills
- Rosla

External Refurbishment Details for System Built Schools

Typical detail showing the re-configuration of a system built school to reduce glazed areas and in doing so modifying solar gain, heat loss and glare.



Examples of System Built School

Structural External Wall Insulation was used to re-configure and reduce the glazed areas of Kesteven & Grantham Girls School.

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