

British Iron and Steel Federation (BISF) Houses  
External Wall Insulation Project  
Forehill, Ayr, South Ayrshire



## Introduction

This project formed part of the Scottish Government funded Home Energy Efficiency Programmes for Scotland: Area Based Schemes (HEEPS:ABS) for South Ayrshire Council and was delivered by their managing agent the Energy Agency.

The insulation contractor, SERS Ltd, was instructed to install External Wall Insulation (EWI) on 18 privately owned homes.

## Planning

Plans for the project were well received by the residents having previously witnessed substantial upgrades to neighbouring social housing stock.

A pre-project study was undertaken to determine viable insulation solutions for this construction type. The residents were engaged at early stages of the project to determine what type of system would be well received and to gauge appetite for customer contributions.

Two insulation options were proposed including an external and internal system, both requiring customer contributions. A unanimous decision was received to explore the options for an external solution. Most residents were already aware of possible deterioration to the existing steel frame and saw the opportunity to address structural issues at the same time as improving the thermal performance of the building.

## House Type and Insulation Solution

The houses are British Iron and Steel Federation (BISF) Type 1a construction with virtually no existing wall insulation leading to poor thermal performance of the building. The Type 1a property is notoriously susceptible to corrosion of the steel frame especially in coastal locations and therefore a bespoke EWI system and appropriate structural repairs were applied to ensure the existing substrate was able to take the additional load of the insulation system.

The existing ground floor render system (Fig 1) was removed to expose structural steel. Remedial repairs to steel stanchions (Fig 2) were undertaken to make good the steel frame. Some homes required minor repairs and some required substantial repairs on all elevations.



Fig 1. Close up of render removal at ground floor level showing reinforcement mesh through to degraded mineral wool insulation

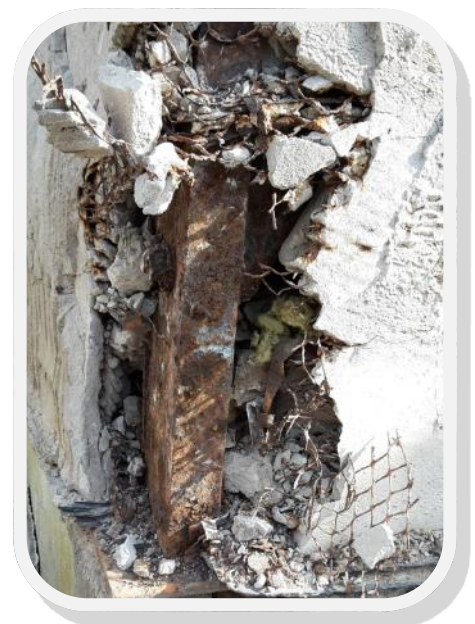


Fig 2. Corrosion of rolled steel stanchion exposed at corner of one of the houses. Repairs were required prior to installing the insulation.

The original ground floor walls consisted of a concrete-based render cladding applied to a metal mesh substrate which was attached to the steel frame structure. A thin layer of mineral insulation was behind the mesh and beyond this the plasterboard of the interior of the house. Figs 3 & 4 below show the ground floor structure with the render cladding and mesh removed.

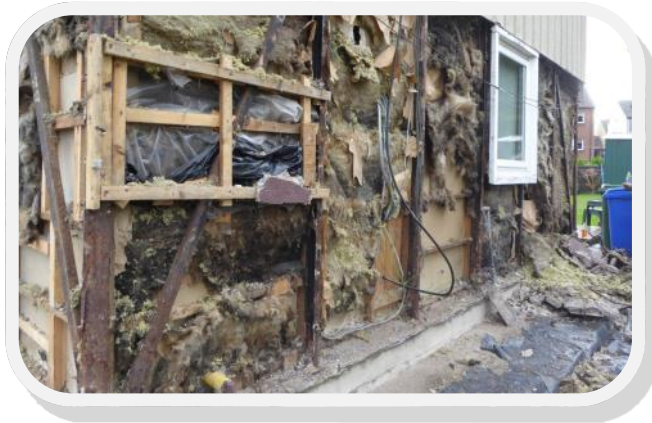


Fig 3. Original ground floor construction with external render removed. The steel frame columns and diagonal bracings can be seen.

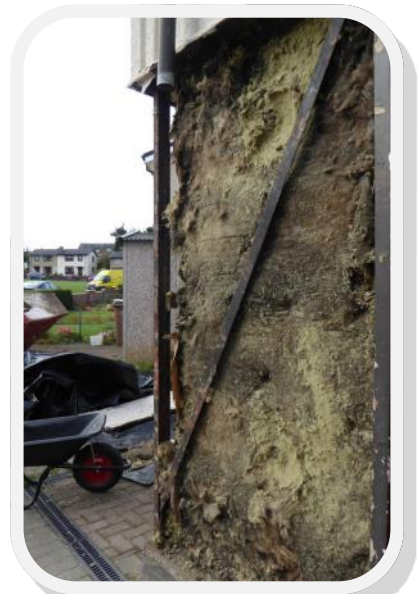


Fig 4. Ground floor steel frame structure at corner of one of the houses.

This original ground floor structure did not provide a suitable fixing for the insulation boards. The houses were therefore stripped of all render and framed with ply to create a suitable substrate for fixing the insulation system (Figs 5 & 6).



Fig 5. Timber structure applied at ground floor level to create a fixing for the ply boarding.



Fig 6. Ply boarding applied to the ground floor, ready for fixing the insulation boards.

This was followed by the installation of 90mm thick Graphite Expanded Polystyrene (GEPS) insulation boards, fixed to the exterior of the houses (Fig 7).

The houses were then finished with render and a decorative dry dash (Fig 8).

Fig 7. Insulation boards fixed to ground and upper floors of the semi detached houses.



## Funding

The final quotation for the works was £11,608 per property. In line with the conditions of HEEPS:ABS, a grant of £7,500.00 was applied to each semi-detached property. ECO funding was also secured at £612 per property which left a customer contribution of £3,496.

Customer contributions were paid using a combination of householder savings and interest free HEEPS:ABS loans.

The extent of structural repairs to steel stanchions could only be assessed once the ground floor render had been removed therefore a proportion of the HEEPS: ABS enabling budget was committed to ensure the customer contribution remained as quoted.

## Project Outcomes

- ◆ The average household fuel cost pre-installation was £1,000 per year reducing to £730 following installation. This represents an average yearly saving of £270 for the households featured in this case study (from EPC data).
- ◆ The average pre-installation SAP rating for these properties was 58 (low band D) raising to an average of 71 (low band C) following installation.
- ◆ Of the 18 properties none were band C prior to the installation and on completion, 13 were band C and 5 band D.
- ◆ Of the 5 properties that have fallen short of achieving band C energy efficiency rating, 4 could be raised to band C by installing low cost draught proofing measures, and the other 1 would require a heating system upgrade by installing a condensing boiler. Typical cost of boiler replacement is around £2,500.
- ◆ The feedback received for the project was very positive with 100% positive feedback for both the managing agent and contractor.



Fig 8. Completed houses in Forehill, Ayr

## Householders Case Studies

### Mr & Mrs A

Mr & Mrs A felt the programme came at an opportune moment as they had recognised that improvements were needed to the property both in terms of the structure and the energy-efficiency. The property was previously draughty and they also had some issues with dampness.

Since the insulation upgrades, they described the property as being much warmer and no further issues with draughts or dampness. They have been able to use their heating less and have also switched supplier in order to get the best deal on their energy bills.

Following the improvements made to the exterior of the building, they have also been motivated to make other changes to their home including renovating the garden and redecorating internally.

There also appears to have been a knock-on effect on the local area as they reported seeing an increased sense of pride within the neighbourhood with people taking more care of their properties and making other improvements.



*“You get up and it’s warm even if the heating’s not on. It’s never cold. It gives you peace of mind”.*



## Mrs S

Mrs S decided to go ahead with the insulation works on the basis that the house was in a poor condition with the steel work and general exterior needing improvements.

Since the installation she has also noticed that the property now heats up more quickly and retains the heat better meaning that she can now use her heating for fewer hours per day. This has resulted in a decrease in her gas bills with a saving of between £10 and £30 per month.

In addition, Mrs S reported a decrease in window condensation as well as noticeable noise reduction.

*“It looks so much better. The rust on the outside of the building was an eyesore before”.*

*“It’s the best thing that has happened to these houses”*



## Mr and Mrs P

Mr & Mrs P chose to insulate their home in order to improve their comfort levels and the appearance of the property.

They have found that the property now heats up more quickly and has a more even distribution of heat.

They also described the appearance as having *“improved a lot”* with the general neighbourhood looking cleaner, brighter and friendlier.



*“It makes the environment look better and its warmer”*