RISE | Retrofit information, support & expertise

BISF Housing

Quick guide

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Contents

Summary

This quick guide has been prepared to inform people on BISF (British Iron and Steel Federation) buildings, highlighting their unique characteristics and the challenges they present when it comes to retrofitting. These properties, often rich in architectural heritage, require careful consideration to preserve their historical value while improving energy efficiency and comfort.

The guide begins with an overview of this housing type, followed by a discussion of the key factors that make retrofitting such homes somewhat complex. It concludes with a summary of common retrofit measures that can be, and often are, successfully applied to these properties.

This is an introduction to this subject. Those wishing to explore this topic further should refer to the relevant material available on the RISE website. Readers that would like this document in a more accessible format should contact rise@turntown.co.uk.

An introduction to BISF buildings

The term BISF stands for British Iron and Steel Federation, and refers to a specific type of steel-framed house developed in the UK in the aftermath of World War II. These homes were part of a broader government initiative to address the severe housing shortage caused by wartime destruction and a lack of traditional building materials and skilled labour. Unlike temporary housing solutions of the time, such as the Hawkley bungalows, BISF houses were designed to be permanent, long-lasting homes, with a full structural steel frame and distinctive architectural features.

Around 35,000 BISF houses were built across the UK, mostly in semi-detached or terraced layouts. Structurally, BISF homes were assembled on-site using prefabricated steel components, making them quick and cost-effective to build. However, their construction, which essentially consisted of large steel frames with plasterboard interiors and minimal insulation, has led to long-standing issues with thermal performance. These homes are notoriously cold, and despite their poor insulation, Energy Performance Certificates (EPCs) often overestimate their efficiency due to assumptions that don't reflect the actual U-values of the materials used. The condition of the homes can also cause problems. A red oxide paint and bitumen coating, which was intended to prevent the steel corroding, has degraded over time.

All this means that BISF houses present challenges for retrofitting, especially in terms of insulation, airtightness, thermal bridging and compatibility with materials. However, there are opportunities to improve the energy efficiency of this housing type. Their regular form and modular construction can lend themselves well to carefully considered upgrades that respect the original design.

Example of BISF buildings

BISF homes are typically found in semi-detached or terraced arrangements and are easily recognizable by their symmetrical façades (figure 1). A defining feature of BISF houses is the corrugated metal sheeting used on the upper floor, which is often painted by homeowners to personalize or refresh the appearance. The ground floor is usually rendered or clad in a different material, creating a two-tone effect that adds to their visual symmetry.

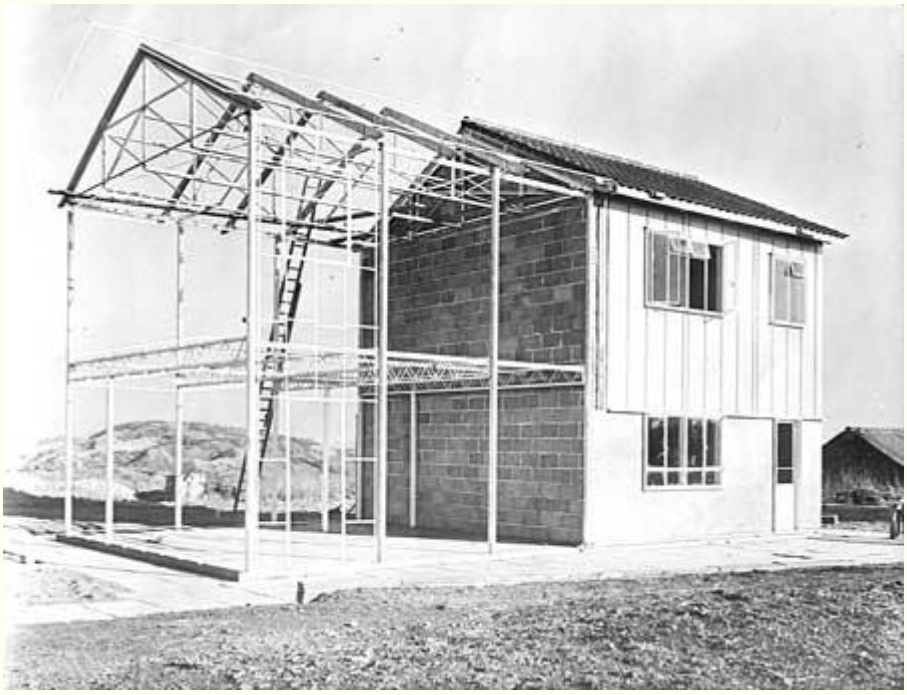

Figure 1 shows the steel frame in a BISF property. Source: structherm.co.uk

Beyond the corrugated steel cladding on the upper floor BISF homes are also usually easy to recognise due to their symmetrical design and often brightly painted exteriors, which give them a cheerful, almost "Balamory-like" charm. Many BISF homes are also characterised by their overhanging porches or canopies, which add character to the properties but can complicate retrofitting due to the extra cost of preserving or adapting them.

While all BISF houses share a common structural system – steel frames with lightweight cladding (figure 2) – there are subtle variations between the types:

- **Type A1 houses:** the most widespread and generally consistent in layout and materials.
- **Type B houses**: Less common, may exhibit slight differences in detailing or internal configuration.

Figure 2 shows a BISF property with its original asbestos roof and awning over the door. Source: structherm.co.uk

Retrofit considerations

The structural innovation in BISF houses present additional challenges that complicate retrofit. These include issues arising from ensuring fire safety, identifying and addressing asbestos, and steel corrosion:

- One significant concern when dealing with BISF properties is the presence of asbestos, especially in the original corrugated metal roofs. Although many of these roofs have been replaced in social housing stock, the risk remains in some properties
- Additionally, there is risk of fires in these properties. When drilling into glass quilt insulation, sometimes found in the walls, there is a risk of fires being ignited, though glass quilt insulation isn't present across all BISF homes
- Another significant issue is steel corrosion, particularly at the steel feet, where the frame is bolted into the foundations. In exposed elevations, these areas can deteriorate over time, and if not addressed, they can prevent or delay the installation of external wall insulation (EWI)

These considerations combined with the already poor thermal performance of BISF homes, mean that retrofitting requires careful planning, specialist knowledge, and often additional capital. Despite these notable challenges, with the right approach, BISF houses can be upgraded while preserving their unique character and improving comfort and safety.

What sort of retrofit measures work well?

Like other system build houses, there is a significant emphasis on implementing a fabric first approach when retrofitting. Measures that may be installed in BISF buildings include:

- **Wall insulation:** EWI is usually the preferred retrofit approach, as these properties are often set back from the road, allowing sufficient space for external insulation to be installed. Internal wall insulation (IWI) is less commonly used
- **Window upgrades:** In BISF homes, window upgrades are generally the first retrofit measure that is installed due to them being straightforward yet effective measures to implement
- **Loft insulation:** BISF properties typically feature a pitched roof with accessible loft space, making insulation upgrades relatively simple. Adding or topping up loft insulation, installing insulated roof panels, or addressing thermal bridging around eaves and junctions can significantly reduce heat loss. In some cases, the roof covering may also be due for renewal, providing an ideal moment to integrate insulation and ventilation improvements as part of a comprehensive retrofit
- **Heat pumps:** Like most non-traditional buildings, heat pumps are a feasible retrofit measure to be installed, however other measures should be installed first to ensure the home is thoroughly insulated first or the price of running the heat pump may be extremely costly

Further resources

For those seeking to better understand BISF buildings and the challenges surrounding retrofitting them effectively, the most helpful resource is:

- The **Non-Standard House Construction** website provides a collection of articles and resources that explore BISF Houses, highlighting both the necessity and the challenges of retrofitting these unique structures.
- Another excellent resource is the BRE Group, which provides comprehensive coverage on various topics related to cast in-situ buildings through their extensive publications, including the **Non Traditional Houses Publication.** This requires purchase.