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System Built Housing: Cast in-situ

Quick guide

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Summary

This quick guide has been prepared to inform people on the nuance around cast in-situ housing. The document will offer an introduction into this housing type, before highlighting why these buildings are considered differently when being retrofitted. It ends with a discussion about some of the retrofit measures that usually work in these properties.

This is an introduction to this subject and those wishing to pursue this topic further should refer to the relevant material on this topic on the RISE website. Furthermore, readers that would like this document in a more accessible format should contact rise@turntown.co.uk.

An introduction to system built – cast in-situ

To understand cast in-situ housing, it's helpful to look at back at recent history. Before the First World War, buildings typically had solid walls made of brick or stone with mortar. These structures would get wet and then dry out, and although they were drafty, this ventilation helped keep open fires going and ultimately worked well for its time.

Post-war, there was a significant skills shortage due to the loss of life during the war. This coupled with an urgent need to build homes quickly at that time led to the development of system-built housing. Partly inspired by Victorian philanthropists who aimed to create quality social housing, these homes were also designed to be constructed rapidly with less reliance on skilled labour. This approach can be seen as a forerunner of Modern Methods of Construction (MMC).

System-built cast in-situ homes encompass a range of designs intended for quick assembly. Techniques included pouring concrete into in-situ concrete shuttering, before removing the shuttering to leave behind the newly cast wall. This is similar to bronze casting but on a massive scale! Some cast in-situ concrete buildings also utilised precast reinforced concrete (PRC) to supplement their cast in-situ core design elements. PRC is like largescale Lego building, because the components come pre-made and ready to be fit together.

The primary differences between these and traditional constructions lies in the method and material of construction.

Example of cast in-situ buildings

The two most commonly encountered cast in-situ building designs are Wimpey no-fines (which get their name from the builder, Wimpey, and the no-fine aggregate concrete mix which was used [Figure 1]) and Laing Easiform (Figure 2). The no-fine aggregate used in the Wimpey no-fines was used for cost reasons, and it was also believed to possibly help insulate the home better by trapping air.



Figure 1: A cross section of a no-fines wall. Source: Non Standard House Construction

Several designs fall under these two cast in-situ categories, from terraced to semi-detached houses. Variations were also made in response to local materials or skills shortages, as building processes were less controlled than they are today. Consequently, though Wimpey No-Fines and Laing Easiform buildings are widespread across the country, each estate and property can have unique nuances that owners should seek to understand prior to retrofit.



Figure 2: A Laing Easiform property. Source: Bailey Garner.

Why these buildings are considered differently when being retrofitted

Cast in-situ buildings are often considered differently from traditional housing when it comes to retrofitting, primarily due to their unique construction methods. Energy Performance Certificates (EPCs) for these properties can be misleading, as the Reduced Data Standard Assessment Procedure (RdSAP) methodology incorporates assumptions for system-built homes can be overly favourable.

Additionally, cast in-situ buildings can be seen as hard to retrofit. This is because the buildings are less well-known and understood, which means signs of potential problems may not be easily spotted and diagnosed correctly. Often, the only way to fully understand these buildings and their condition is through investigation by experts familiar with this specific building type.

These factors contribute to the perception that cast in-situ buildings require a different approach to retrofitting compared to traditional housing.

What sort of retrofit measures work well

Beyond standard detailing works, there are several measures to consider when retrofitting cast in-situ housing. Deciding which measure to implement depends largely on the houses' initial condition:

- **External wall insulation (EWI) and window upgrades:** The most commonly implemented retrofit measure in cast in-situ houses, as this housing type typically lacks cavities that are suitable for insulation. They also often have walls with low U-values, meaning they lose heat quickly
- **Internal wall insulation (IWI):** Whilst this solution can be employed technically, its installation is intrusive and disruptive. It is often viewed as trickier to do than EWI for similar results in energy efficiency terms, and less opportunity to improve buildings' external appearance. Usually, cast in-situ homes are not subject to the same planning restrictions as older solid wall homes, making EWI often the preferred option
- **Underfloor and loft insulation:** Underfloor and loft insulation can be applied to most cast in-situ types, although the usual challenges around underfloor insulation being disruptive or technically challenging remain. This is because many cast in-situ homes have solid floors making floor insulation more challenging to install than if the floor was a suspended timber floor. Loft insulation offers excellent results for the level of cost involved, and can be installed quite easily

- **Heat pumps:** Once housing is insulated heat pumps are increasingly being installed. This often is a simple process with cast in-situ housing as they are generally quite spacious, so there is room to fit the heat pump outside and the cylinder internally

Where can people find out more

For those looking to expand their knowledge on system build cast in-situ housing beyond this quick guide, there are additional valuable sources to consider. These include the Non Standard House Construction (NSH), which offers a wealth of information non-standard house construction. 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.



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