HIDDEN DEPTHS

RCI DECEMBER INSULATION

The correct specification and installation of insulation materials is a key part of securing Part L compliance and preventing thermal bridging. Traditional methods focus on treating the roof, exterior walls and ground floor of a building, challenging specifiers to consider the variable performances of different areas when seeking to meet specified standards. Where developments are targeting higher levels of the Code for Sustainable Homes, this challenge is compounded, with significant increases in insulation necessary to achieve much lower U-values. Mark Gray, technical manager, Insulslab SFRC, discusses how recent advances in foundation technology are helping to significantly improve ground floor thermal performance without increasing insulation depth.

There are a number of traditional foundation systems which are commonly used: suspended slabs, beam and block, raft foundation and piled foundations. These methods require the insulation material to be laid directly on the ground floor slab, with the screed then cast on top. With this type of floor build-up, the only way to achieve low U-values is to increase the depth of the insulation layer, which ultimately has a negative impact on floor depth and will increase material cost.

The foundation structure of a building normally falls outside of Part L considerations, as it is the floor build-up which provides the necessary insulation. However, advances in foundation technology have led to the development of fully integrated systems which deliver the foundation up to ground floor slab level, and importantly, integrate the insulation material within the foundation system. As well as negating the need for an additional insulation layer at ground floor level, these new systems can easily achieve very low U-values.

Integrate to Insulate

The insulation properties of integrated foundation systems are derived from their structure, which is composed of expanded polystyrene (EPS) pods encased in steel fibre reinforced concrete (SFRC). This type of super-insulated integrated foundation system typically delivers very low U-Values of around 0.10 – 0.12W/m2k, depending on P/A ratio.

For traditional floor build-ups to achieve the same thermal performance as modern super-insulated integrated foundation systems, the insulation layer would typically need to be increased to an approximate thickness of 160mm to 180mm. As this would significantly increase the overall floor depth, additional excavation would be required to retain the original finished floor level. The time and resource necessary to undertake these works mean such an increase in insulation layer thickness is not viable.

While common insulation methods currently meet minimum Part L standards, proposed changes to Part L and the Government's target for zero carbon homes indicate that this will not be the case in the future. The consequence of this is that developers, particularly housebuilders, need to consider alternative construction methods that can achieve the enhanced levels of thermal performance, without negatively impacting on project timescales and build cost.

Super-insulated integrated foundation systems are a future-proofed modern method of construction and offer developers peace of mind and protection in the long term. For example, it is simple to further engineer the EPS pods to increase thermal performance. Alternatively, the thickness of horizontal edge insulation, which is installed around the foundation perimeter, can also be increased.

HIDDEN DEPTHS CONT'D

Under current compliance the holistic design of the building provides the necessary thermal performances. By delivering increased thermal performance at ground floor level, these integrated foundation systems facilitate greater flexibility within the overall design of the thermal envelope. For example, it may be possible for a partial trade-off in other areas of the building performance to meet minimum Part L standards. However, with further changes detailed for 2010, 2013 and 2016, it is anticipated that the performance of other areas will also have to improve. One of the main concerns with increasing thermal performance throughout the entire envelope is the impact on building footprints. Super-insulated foundation systems have the potential to help specifiers keep this under control by minimising building width.

From a Code for Sustainable Homes perspective, modern integrated foundation systems also make a significant contribution. Their thermal performance assists within the Energy category, while as a building element, it also contributes to the Material category. When considering the overall building envelope therefore, these systems are a flexible specification that translates into a cost effective and practical solution on-site.