



PRECAST FLOORING FEDERATION

technically sound solutions

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Floors without flaws

B&E HEARS FROM PHIL HARRIS OF PRECAST FLOORING FEDERATION'S MARKETING COMMITTEE ON HOW PRECAST FLOORING PLAYS AN IMPORTANT ROLE IN BUILDING ON BROWNFIELD SITES, AND HOW IT CAN ALSO PLAY A HOLISTIC ROLE TO MEET REGULATIONS ON INSULATION.

There are two main requirements in new housing that are leading to a dramatic rise in the use of precast concrete flooring, Phil Harris of Precast Flooring Federation's Marketing Committee tells B&E. One is to do with gas penetration, the other insulation.

Keeping gases out

Although infill dwellings and brownfield land are gaining ground as a way of easing the housing shortage, not everything in the garden is lovely. In particular, methane and radon can create problems. Generally, methane - which creates an explosive mixture with air - arises from brownfield sites contaminated by earlier industrial usage or from landfill containing organic material. Radon, a radioactive gas resulting from the natural decay of uranium to lead, can accumulate over time and increases the risk of lung cancer. The greenhouse gas carbon dioxide can also be a problem on brownfield sites, while other hazardous gases include carbon monoxide, hydrogen sulphide and hydrogen.

The solution to any such gas penetration is precast concrete ground floors incorporating a membrane above a vented plenum. This forms an efficient barrier to the gas, while natural underfloor ventilation by way of vents and airbricks avoids any potential build-up. The membrane provides a seal typically formed by using a high-performance polyethylene membrane laid across the beam-and-block floor creating a cavity tray when crossing the cavities.

The Precast Flooring Federation (PFF) and the Radon Council are preparing a data sheet that covers the incorporation of membranes within the precast floor design.

Keeping heat in

The preferred u-value for a new build domestic ground floor is 0.22, and the maximum permissible performance is 0.25.

This is on condition that the roof, wall and floor work together to reduce heat loss from the building. If one element performs below standard, it will act as a heat sink and the insulation of the whole building will suffer due to (and will cause) problems of condensation.

But nothing stands still and, in the PFF's opinion, further improvement to insulation values to 0.20W can only be a few years away.

Although some in the industry may question the need for change, a few statistics illustrate the reasons. Amazingly, 42% of all the energy generated in Europe is consumed in buildings, and heating accounts for most of this. Furthermore, 86% of fossil fuel consumption is used to produce this energy, and less than 1% in the production of insulation materials to save energy. If floors are insulated to the u-value of 0.22, it is estimated that the lower heating bills would recoup the cost of the insulation within three years.

Indeed investing in improving the floor from 0.25 to 0.22 is generally considered to provide a better return than any other element within a dwelling.

Insulation works all year around, your dwelling will benefit from being warmer in the winter and cooler in the summer.

Beam-and-block construction with an expanded polystyrene (EPS) over-layer has been used extensively over the past 25 years. As u-values have become more stringent, the depth of this EPS layer has increased from 40mm to as much as 120mm, or 80mm for a layer of polyurethane. Using EPS panels reduces floor depth to a minimum and they are fast replacing the traditional standard building blocks between T-beams: U-values of 0.22 and 0.20 can be achieved with a 17kgjm³ panel. Using EPS as insulation means less manual handling, and it is easier to cut.

Recognising that the beam in any beam-and-block floor can act as a cold bridge, flooring manufacturers have introduced a flange onto the bottom of the panel to cloak the underside of the beam. Additional EPS edge strips deal with areas such as perimeters where cold bridging may occur. Insulated floors can cater for membranes (airtight, methane or radon), under-floor heating systems, and concrete topping. Apart from its intrinsic properties of strength, reliability and durability, precast concrete flooring can remove problems of gas (see page on brownfield sites). At the same time, the use of precast floors is solving the problem of hard-to-heat homes by improving insulation within their floors.