BUILT PASSIVE HOUSE PROJECTS

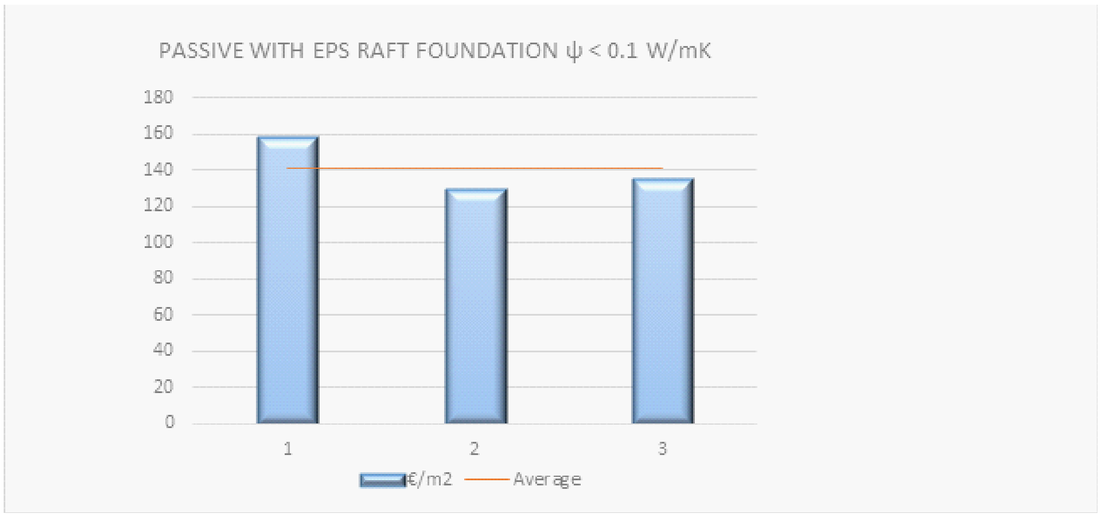
Passive House, Building on Solid Foundations

1. FLOAT A RAFT OR DIG A STRIP

The continued development in thermal block material and the reduced cost of thermal bridge analysis has led to the identification of alternative foundation solutions for Passive House bases centred on the traditional strip foundation. These alternative solutions offer comparable if not better performance at a lower cost than their EPS raft equivalent.

2. THE EPS RAFT EXPERIENCE 2011-13

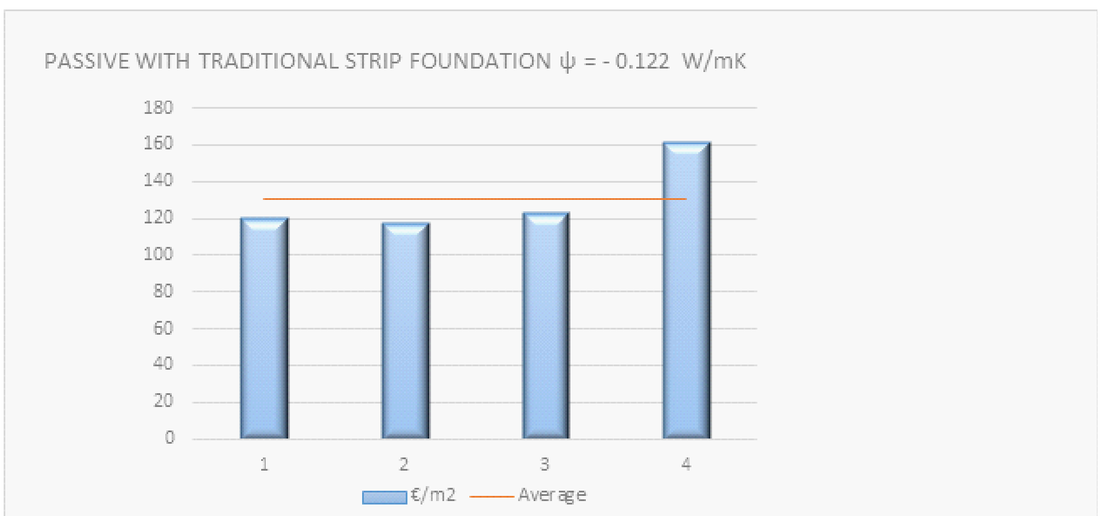
The houses listed in Table 1 below were all masonry construction. Houses 1 & 3 were bungalows with double leaf masonry walls and bonded bead cavity insulation and house 2 was a two storey dwelling with single leaf block and EWI.



These bases required 25-30% less concrete than their strip foundation equivalent but required more steel. It was difficult to find structural engineering competence to design the rafts. In addition, structural defect insurance was difficult to obtain.

3. TRADITIONAL FOUNDATION AND THERMAL BLOCKS

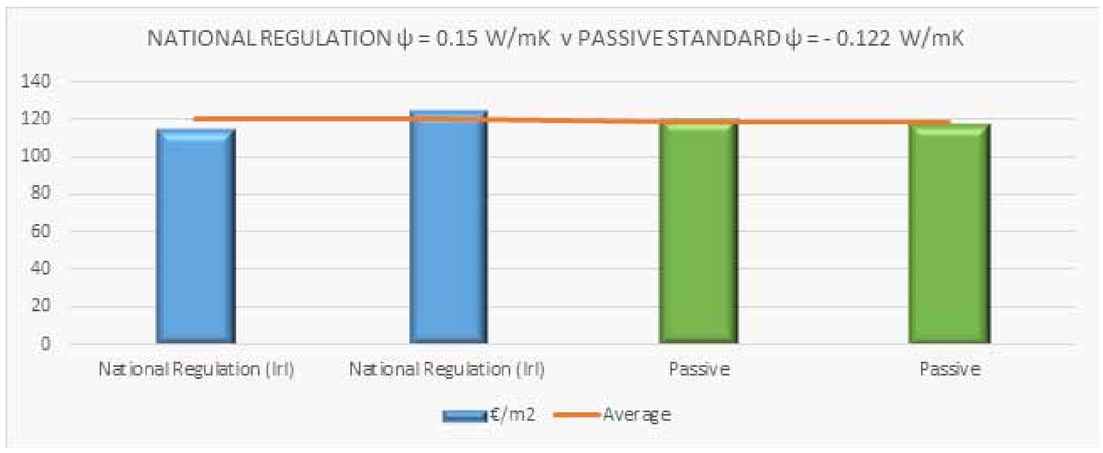
Since 2012 aerated concrete thermal blocks (thermal conductivity 0.17W/mK) have made a critical contribution to reducing the wall-floor thermal bridge. This allowed the development of a floor-wall junction detail that achieved a thermal bridge free base, see Figures 1 & 2.



4. BUILD PASSIVE HOUSE BASES FOR NO EXTRA COST

The net effect of the recent tightening of European building directives has been to close the gap between national building regulations and the Passive House standard. Designing bases to Passive House standard using the traditional foundation strip and aerated concrete block delivers a more cost effective floor build-up. Designing using such traditional techniques also promotes buy-in from all disciplines throughout the design & build cycle.

A revolution in thermal bridge performance is achieved through an evolution in the lay-up of traditional strip foundations.



The cost of building a Passive House base using traditional strip foundation and thermal blocks is 10% cheaper, on average, than the EPS raft equivalent from 2 years earlier.

Figure 1:

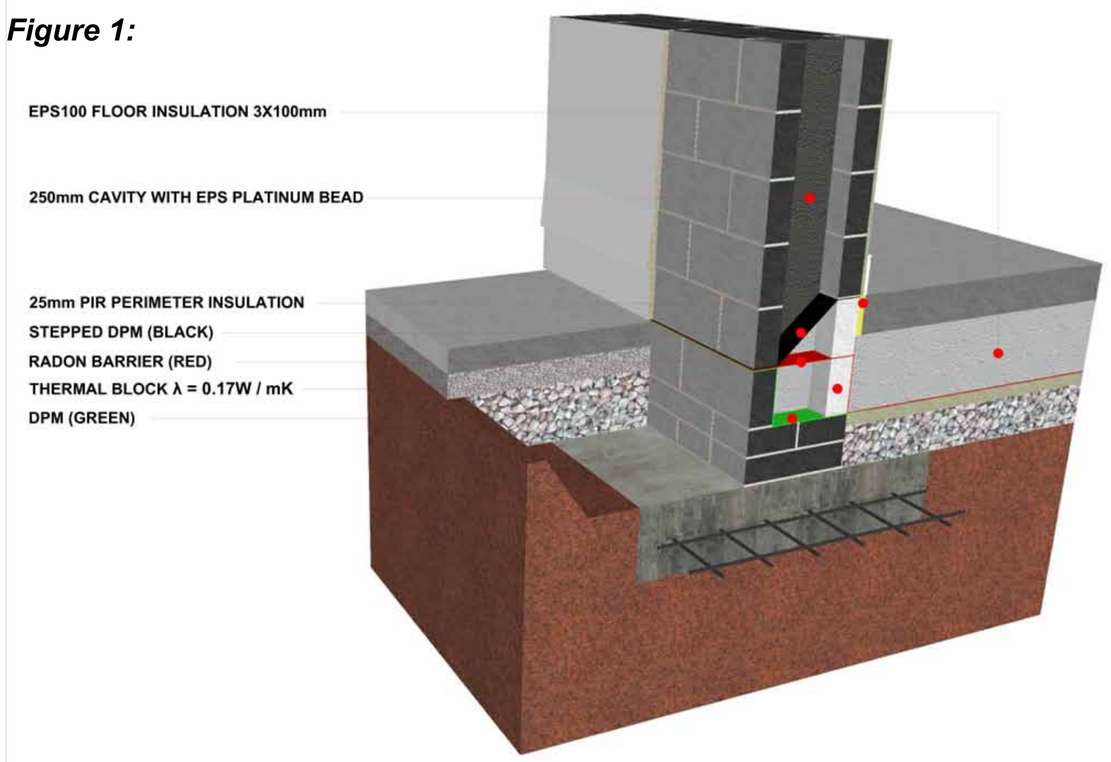
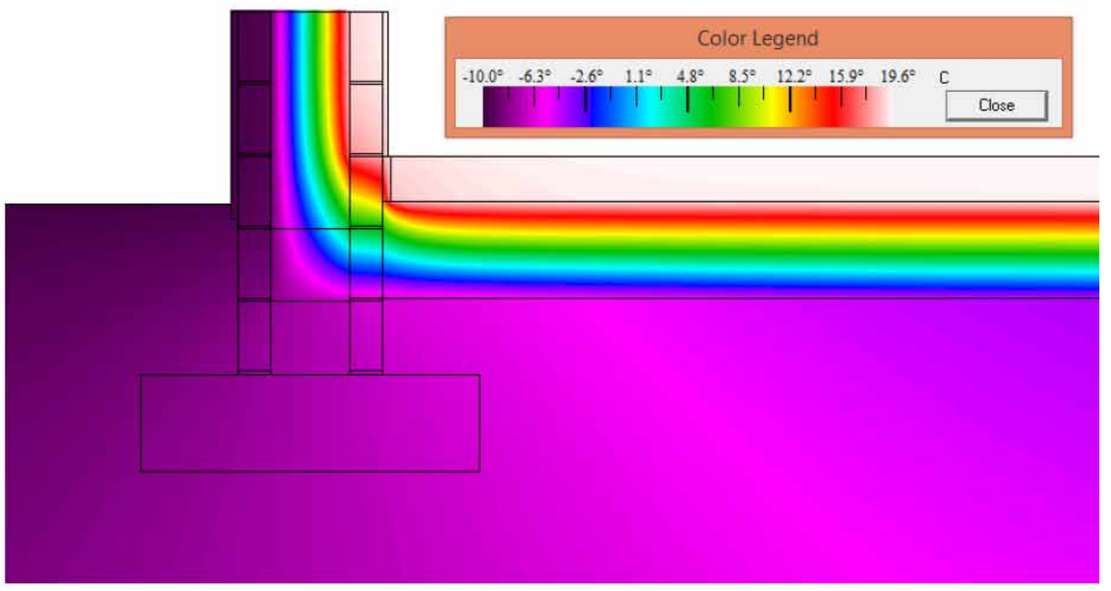


Figure 2: Therm V7.2 model of junction giving Psi = -0.122W/mK



Strip foundation designs, similar to the one illustrated in Figure 1, have been certified for timber frame structures by the Passive House Institute.
The key requirement, regardless of the house construction type, is to ensure that the aerated concrete block is protected from moisture.

W: www.edmondodonoghue.com
E: edmond.donoghue@gmail.com
T: +353 87 9229798
A: CORK, IRELAND