

The theory of earth sheltered buildings isn't new. But in practice there isn't a lot of data about how they really work. Architect Jerry Harrall is set to redress this balance with his own living experiment in earth sheltered buildings. By Karen Fletcher.

What's the best way to find out about how earth sheltered buildings work? Design one, construct it and live in it would be the most obvious answer. That's just what chartered architect Jerry Harrall has done. He has designed and built an earth sheltered office for his Lincolnshire-based practice Sustainable Ecological Architecture (SEARCH) and on the same site, an earth sheltered home which will be occupied by him and his family. The construction is also part of Harrall's research for his PhD.

"The aim of this research project is to assess to what extent it is possible to construct zero space heated earth sheltered buildings, and achieve acceptable comfort zones," says Harrall. Both buildings also use low embodied energy construction materials, and the aim is that they have minimum environmental impact.

"We believe that the office is the first earth sheltered architects' office, designed specifically around passive solar design techniques, with the benefit of academic research. The dwelling is the first in the UK for similar reasons," he adds. But perhaps the most unusual feature, and the centre of the research project, is that 88 temperature monitors are built into the superstructure of the buildings to provide unique

thermal performance data.

Both buildings are constructed using similar techniques and materials, with different layouts reflecting their different uses and periods of occupation. Both buildings are single storey, orientated south using passive solar gains as the main heat source, and passive ventilation techniques for cooling. The theory of the earth sheltering (and the main subject of the monitoring) is that it will maintain a steady internal temperature for both buildings (around 20°C) without the need for additional mechanical heating or cooling.

Site layout

Harrall built the office first, in order to identify any teething problems with the materials or methods of construction before tackling the larger project of the dwelling. At the time of *BSJ*'s visit in March, the office was completed, and occupied, while the dwelling was in the early stages of construction.

Both buildings occupy land that was a former brickworks on the outskirts of a small market town. The buildings are set back slightly from the main road, with hedging that helps reduce road noise.

The 54 m² office building is oriented south-