

# Making the most out of SIPs

## Rebecca Foster sets out how to maximise the advantages of this energy efficient structural system

Swift construction speeds, excellent thermal performance and design flexibility are just a handful of the benefits offered by structural insulated panels (SIPs). This build system is made from a network of robust composite panels, each of which comprises a layer of plastic-based insulation sandwiched between two wood-based sheets. The components are precision engineered in your supplier's factory before being delivered to site, where they slot together to form the floors, walls and roof of your home.

This level of prefabrication means you can, firstly, guarantee a predetermined level of airtightness/thermal performance straight out of the box and, secondly, plan your build schedule around a highly-predictable, factory-controlled manufacturing and assembly process. However, if you're investing in SIPs as the structural system for your self build, there's more you can do to capitalise on the various benefits this method offers.

### Thermal performance

"One of the principal advantages of a SIPs build is the improved thermal performance you get from such an efficient structural envelope, thanks to the system's unique insulated joints on all the walls and the roof," says Mike Fleming, sales director at Glosford SIPs. This system offers impressively low U-values (a measure of heat loss, where

lower numbers indicate superior thermal performance), typically between 0.21W/m<sup>2</sup>K and 0.1W/m<sup>2</sup>K.

To make the most of the airtight shell, it's worth considering aspects such as the glazing specification as early as possible during the design phase. Triple glazed windows and doors, for instance, will enhance the performance of the thermal envelope as a whole. "As a result of these benefits, the heat load required to warm the house is kept to a minimum. This equates to low running costs, which is something homeowners will notice straight away," says Derek McIntyre, commercial manager at JML SIPs. The lower heat demand also means that your house could be a good candidate to incorporate renewable tech to heat the property – more on this later.

Another key factor to think about in conjunction with your home's thermal performance is general comfort levels in the living areas. A SIPs structure will, of course, establish an efficient, draught-free shell. However, to ensure the internal climate of your home remains pleasant and fresh, it's worth considering some form of controlled ventilation, such as mechanical ventilation and heat recovery (MVHR). "This setup provides a constant supply of freshly filtered air circulated around the house, while helping to distribute recycled heat throughout at the same time," says Derek. "This not only helps the house to breathe but it also creates a pleasant internal environment to live in."

### Design possibilities

SIPs offer great thermal performance in a slim panel thickness. Coupled with their innate strength, this brings multiple benefits for your house design. "With thinner construction components than traditional build methods, SIPs will provide a larger floor area, giving you additional

living space in all areas," says Ian Clay, partner at SIPs@Clays. Your architect will be able to factor this in to his or her plans at the outset of the design process, using SIPs to make the most of the space your plot has to offer.

Another design advantage lies in the fact that a SIPs system does not need to incorporate trusses to support the roof of the house. This, in turn, gives you greater flexibility to have a lofty, double height ceiling, or even extra accommodation in the attic. "Nowadays, open-plan living is more popular and many of the self builders we work with are looking for a feeling of space with higher ceilings," says Derek. "Our panels span from the top of the wall up to the ridge, creating a vaulted area as standard. The alternative way to achieve this arrangement without SIPs is very labour intensive on site and uses a large amount of timber." Again, to make the most of this built-in design benefit, you'll need to factor it in at the earliest stages of the planning phase when you're deciding what rooms to have and where to position them within the floorplan.

### Precision engineering

Once your architect's detailed drawings are submitted to your SIPs supplier, the panels are manufactured via an advanced, computer-controlled process under stringent factory conditions. This means the panels should be produced to a high level of accuracy, which will enable quick assembly. Armed with this degree of certainty regarding the structural components, you're in a good position to get ahead with other elements that come with a lengthy lead time – specifically, bespoke glazing. "Windows and doors, which can be on long lead times, can be ordered early in the confidence that once the SIPs package is completed, glazing can be installed immediately," says Mike. Ordering off-plan allows you to avoid delays for measuring up later in the project, ultimately enabling you to progress to wind and watertight stage quicker.

### Swift construction

To make the most of SIPs' quick build speed, it's important to get all the preparatory works completed while the



Above: SIPs provided the ideal build method for this home, as the owner wanted to create a low-energy house in this stunning off-grid location. JML SIPs designed, manufactured and erected the SIPs kit. Below: This project, by SIPs@Clays, shows the construction process on site

structural components are still being manufactured in your supplier's factory. "Preliminaries, laying of the foundation slab and the installation of site equipment should be carried out prior to SIPs delivery," says Ian. With this in mind, don't forget that you'll need to arrange the hire of the scaffolding, crane and skips yourself, as well as factoring these elements into the overall budget. "It is also important to have your site as clear of material as possible. This will enable the installation team to have plenty of space to work, allowing them to erect the structure quickly and efficiently, without hindrance."

Once the structural components are delivered, a SIPs house can reach wind and watertight in as little as two weeks. To maximise the benefits of this speedy process, carefully schedule in the follow-on trades you'll use later in the programme. Once the shell reaches watertight, you will be able to bring in internal and external trades to work simultaneously – an advantage that you wouldn't get with some build systems, such as masonry. "It means trades have solid, clean and straightforward surfaces to work off," says Ian. Highly recommended professionals often get booked up for months in advance, so make the most of



Above: Delivered by SIPs@Clays, the structural envelope for this house was erected in just 10 days. A mix of external finishes, including bricks and timber cladding, have been used, showing the versatility of SIPs

**CLOSER LOOK: AVOID THESE MISTAKES**

- **Don't get bogged down by budgeting** SIPs is a premium system, so typically, the outlay for your kit will be higher than what you'd pay for a more conventional option, like masonry. "It's easy to lose sight of the many long term benefits that a SIPs build brings when you're only focusing on the pounds," says Ian from SIPs@Clays. Remember, for instance, that running costs will be reduced once the house is complete.
- **Don't rush the design process** There's a lot of upfront planning to do before finalising the design of your SIPs house. Thinking carefully about what might seem like small details, such as the placement of your MVHR ducting, will minimise the risk of issues later. "The location of ducts needs to be identified early to enable the correct alignment of floor joists and any other technical intricacies," says Ian. "This will ensure value engineering and precise fabrication which could save time, hassle and additional costs at the back end of your project."
- **Don't leave it to the last minute before appointing your SIPs supplier** Though an independent architectural practice may be responsible for putting together the initial plans for your house, your SIPs supplier will take the lead when it comes to the structural engineering design calculations. "This is part of their service," says Derek McIntyre from JML SIPs. "Each company has different details and panel thicknesses, which will influence your design drawings. Bringing your supplier on board early saves time and money, as opposed to having to re-do your plans to suit their details afterwards."

Right: Featuring a crisp render finish above a characterful layer of stone, this contemporary home was delivered by Glosford SIPs



your highly predictable construction process by booking in the individuals you want to hire ahead of time.

### Boost your eco credentials

There are numerous green advantages that come with SIPs. As well as the thermal benefits of a fabric first approach, the highly engineered manufacturing process minimises the amount of off-cuts and waste that are produced. The lightweight nature of the panels means the overall loading of the foundations can be reduced, too, so you're using less materials overall. "We recommend supplementing the SIPs kit, where possible, with other low-energy solutions that maximise the benefits," says Derek from JML SIPs. For example, a renewable heating setup powered by an air or ground source heat pump is one way to make your project a little greener.

If sustainability is at the heart of your scheme, you might choose to think beyond the build system by

considering the application of natural materials and finishes when it comes to kitting out the interiors. With any construction method, adopting this approach will boost the overall eco credentials of your self build project. Many products, including paints, glues and wood-based items contain toxic chemicals that emit volatile organic compounds (VOCs) into your finished house. While not all of these are harmful to health, some new build homes contain undesirable levels of toxins like formaldehyde. Specifying plant-based paints, for instance, can provide a high-quality alternative. Conventional carpets could also be substituted for eco alternatives like jute, coir or sisal.

#### CONTACTS

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