

Episode 23

A Cottage Built with Structural Insulated Panels

The show notes: www.houseplanninghelp.com/23

Ben: I'm with Kingsley Barraclough today, who has commissioned his own house build and we're going to learn from some of his experience, but maybe first of all, are you at a slight advantage that you have got a lot of plumbing experience?

Kingsley: Yes, I think that does give me quite an insight because I've spent 10 years looking at houses losing heat and being inefficient, and putting up radiators and had a long hard think about how to make a house that I would like that works for me. You come down to the mechanics of it, are radiators really something I want to lose lots of wall space to? Is it an efficient way of percolating heat through a house? No, and it limits the use of the house so really my driver was how to make a small space that was very flexible and easy to heat, and that's how we've come up with the design that I have opted for.

Ben: How did you form your brief? Energy efficiency was clearly important. What was the purpose of this house?

Kingsley: Okay, natural light was another very big driver for me. I currently live in an 1884 house, which is very nice. Delightful, character house, I think is the phrase. Sash windows and all those lovely features that we like but actually I'm moving into that quarter of my life where I simply want something that is easy, manageable, reliable and very low tick-over costs. So the entry costs to achieve it are less scary than the running costs of it to me. That was part of the brief that I had with the architect and with the project manager. I wanted to have a more, I think you'd call it, Scandic sort of feel.

Having had lots of quirky nooks and corners in my old house I actually want a smaller space, all of which I can use, that there's natural light and warmth wherever I go in the house. That's how we've come up with this fairly open plan design that I can use any part of and know I'll be warm and there's natural light nearby. That just produced exactly what I want.

Ben: What options did you look at to begin with?

Kingsley: Well, being in the construction trade myself as a plumber I have seen most of the wet trades in practice for all my working life and although I love and respect the people that do it, in actual fact it's not very scientific. Everything else in life seems to have got a lot more systematised, except construction. I thought I'm sure there's something that I'm missing here and it still isn't the standard way of doing things to think about it in production terms.

So I started taking an interest in how they do this in countries that have more extreme weather, well before ours started getting extreme and clearly Germany and Scandinavia have their kit house solution but I didn't really want that look. Then I just happened, by chance, to park next to a man who had a brief on his passenger seat for a sustainable house and I ambushed him. That was three years ago. [Kingsley laughs.] He's the person I ended up employing to do this build and it's just been a dream outcome, to be honest.

Ben: I'm quite intrigued, too, that you have this professional insight yet you've kept yourself very much as the client. Why?

Kingsley: Well, I have watched these wonderful programmes where people take off their suits and become project managers and occasionally they get it right and it's wonderful but my own experience of project management is that it's a skill I don't have. Although I can be part of a team, actually running a team and coping with all the myriad of things that can go wrong and keeping your own function running is not something that I wanted to take on.

So I went and had a chat with my friendly bank manager to see how they run developments and they use a creature called a monitoring surveyor, which seemed a bit extreme to me so I negotiated at the suggestion of my project manager a different arrangement, which was to employ a contract administrator, who's a third party, who's on my payroll of course, but acts as a membrane between the builder and me. So if I have any concerns, I can talk to the administrator. If he has any concerns about me, paying him unreliably or whatever, he can talk to him.

It just produces this wonderful neutrality that means that my hairline hasn't moved once during the entire build. [Kingsley laughs.] I've never needed to chase anybody for anything but it's just been nice to know that there's somebody I can go to without

having to get anxious or extreme with people on the site. It's worked well for both sides, actually, and for the builder.

Ben: And does that follow through into the plumbing, because you could have saved yourself some money, presumably, doing the work yourself?

Kingsley: Well, I did think about that. In actual fact, having gone to have a look at a couple of the projects that Peter Carter, my builder, was running there was such a good chemistry on his building sites that there is no way I'd want to interfere with that.

To be honest when you meet people who work together for 10 or 15 years on jobs that he runs, the idea of introducing a well-intentioned punter who happens to be a plumber, it's just not going to be a helpful thing. I do wear various other hats and he doesn't want to know that I've gone off to look after my mum for the day when I'm meant to be putting a bath in.

I was very happy with the standard of work that these chaps did. They have a system. They work through it. It's programmed. It wasn't worth compromising that for a good outcome and frankly they've done it in a better way than I would have done it because I would've been trying to fit in with systems that I'm not familiar with.

Ben: You've used structural insulated panels (SIPs) with this house. Which came first – was it the architect or the structural insulated panels?

Kingsley: Very interesting question, that. In actual fact, at the architectural stage we hadn't even decided what building technique we were going to use. I was very fortunate that I have a good friend and contact, who is an architect not far from here, who is familiar with me and came and looked at the chaos in my old house. Then we sat down and had a chat about what we wanted to achieve in the new one. So he had a good insight into what it needed to do as a living space and it was really completely different to the outcomes I can achieve in my current house. [Kingsley laughs.]

I've got lots of small rooms and just me and actually what I want is far less rooms but more of a contiguous space, where it all feeds through and can be used as a big space if you want to. So, the sitting room, the dining room, the kitchen, they all lead into each other in the new property.

My number one brief was I want as big a windows as I can have, please, so as much natural light. The arrangement of the rooms became pretty obvious when we looked at where natural light hits the house from. Unconventionally my kitchen isn't in the lightest part of the house, although it's the heart of the home. The way that the design works is it feeds through to the rest of the house in such a way that it all works fine.

Having actually got the design as we wanted it, we then of course had to go for planning permission and there were one or two tweaks with that. Really very little other than that the planners were not comfy with the size of windows that I wanted, so we did have to reduce them a little bit, but a bit of a haggle and we've come to an accommodation between the two of us.

At that point, it then became a question of, okay, we've got the planning permission, we've got the design as we want it, how are we going to build it? During the time of getting planning permission I had looked into SIPs panels and had numerous meetings with Peter Carter and been to see some jobs he was running and had decided that's what I want to do, how do we go about that? At that point you take your design, or the design the architect has done for you, to an engineer who can rework the SIPs panel method of construction to fit with your design. So you don't compromise your design to fit with the SIPs. The SIPs is engineered to suit your design.

That basically means that where the timber panels are not suitable, they can reinforce it with steel construction, steel girders, whatever, and achieve exactly the look that you want. Yet at no point did I have to give up anything to compromise with the SIPs and it's a brilliant system.

Ben: Let's take a step back. What is a structural insulated panel?

Kingsley: Right a structural insulated panel is basically a sandwich, so it is 20mm ply on both faces with a filler in the middle, a bit like Celotex materials, so I think that's a polyurethane. It is fire retarded and all the rest of it so it's quite a safe material. I think it's 125mm thick and they are basically machined a little bit in the way that stickle bricks used to be. There are rebates, grooves and fillers that lock all the panels together. Every part turns up labelled and numbered. It is the ultimate kit. If you're into Airfix this is the one to get! And they all interlock.

Basically we put this up at one floor a week. I think the ground floor was done in the first week, the second floor in the second week and you've then got the shell of your house to look at in no time. Fantastic.

Ben: So what are the pros and cons of SIP panels?

Kingsley: What are the pros and cons? Well, the big pro of course is that the construction is effectively done, sorry, the pre construction I suppose is done in a factory. So, it's made off-site to your specifications and delivered in a kit form and it can go up incredibly quickly.

Now for me, that was actually very helpful. Sometimes there isn't a timeline on a job. People are happy to allow two years to tick by because they've got other commitments and don't need to move, but actually in my situation it was worth a lot of money to me for the project to be able to happen in about a 6-month period. I've got other commitments that are taking me away from here so I needed to know it could be done in that time.

The precision of SIPs is quite spectacular. You know, the construction industry does tend to work to the nearest half inch. That's just the nature of block and breeze. With SIPs panels they really are working to about 3mm. So from corner to corner across the building, everything that should be square, flat, straight is square flat and straight.

The people that work with that system, they build up a skill set where they really are putting it together very quickly so you get progress very quickly, which is heartening if you just need to know, I wonder how it's going to look. If you want to get to that point where you can envisage how big a space actually will this be? Until you've got the third dimension, height, it's always very difficult to envisage. So if you're working with bricks and blocks, you've got the footprint but it's not quite the same as feeling the cube. With SIPs, you feel the cube in a week. You can already start envisaging how you'd like to populate that house with your effects.

What else could I tell you? Oh, I know the big plus is that of course they can be working on both faces at once, so once you've built your cell, the timber cell, the services and everything can be going on inside – as in pipe work, electrics, this, that and the other – and the face work, the brick work can be going on on the outside. They are not crossing paths, so you do not have wet

trades interfering with the services. You can effectively have progress on two fronts at once, which is just spectacular. It really is so efficient and quick. I can't think of a down side, to be honest.

I think people used to imagine that somehow it was related to timber frame buildings. SIPs panels, although they are timber, they are not like timber frame buildings so you don't get the movement, the twist, the shrinkage, all these sorts of things that timber frame buildings were famous for and quite possibly still are if they're put up sloppily. This is a high tech building. It really is a very stable material. Such movement as there is in timber is not in its height, it's in its thickness if anything, which is the nature of plywood. So plywood doesn't get longer or wider. If anything, it swells slightly. I'm not suggesting these do but that's the only dimension it would.

Ben: And you say that the pieces are bespoke to your design so you get all of those. What would happen – I suppose this could be a downside – if you decided to extend the house?

Kingsley: Oh no, that's no problem at all. SIPs is absolutely perfect for that. I can't really think of a downside of SIPs construction in terms of add-ons or just modifications, to be honest, because the integral strength in these panels is just phenomenal. You can cut out major chunks and the integrity is still there because the way that plywood woods, as you probably know, there's a lot of cross-plies in multi ply material so there's phenomenal imbedded strength in that, even if you cut quite a chunk of that away.

I'm trying to think of what sort of add-on would challenge the strength of it. I can't think of one, to be honest.

Ben: But, if you wanted to move a doorway, let's say. That must pose a problem? Or not? I'm not saying that you would. [Ben laughs.]

Kingsley: I can only imagine it might do. Well, there must be situations where that must be a problem but I can't think of one. I can't think of when I've ever needed to move a doorway, I suppose. [Ben laughs.] Possibly I'm not a good person to ask. [Kingsley laughs, too.]

Yes, I'm sure Peter could give you a list of situations where it's probably not ideal but frankly I can't think of one and we haven't had reason to . . . How can I put it? I envisaged a possible extension to this at the very start and talked that through with

Peter to say, if I wanted to do such and such, would it be possible? We looked at it and he said it's no problem, is it? We're literally bolting onto the side of what's there, which in not much different to conventional houses.

In fact, to be honest, SIPs panel extensions on conventional houses are quite an accepted way of doing things now. So you will see SIPs construction going onto the side of existing houses.

Ben: And then how do you finish that off? What is the cladding? How did you choose the cladding?

Kingsley: Oh yes, it was quite important in this location to me that it was a nice comfy fit for everyone. All my neighbours have been extremely good to me over the years and I had this plot that I did not want some third party coming in and putting up a home that everyone resented. So I negotiated with the people either side and obviously presented my intentions at every stage so we could all kick it about and check that we were happy with the aspect, the size, those sorts of considerations.

At the end of the day we chose what's called a cottage mix of bricks. That's three local bricks that are used randomly which is quite similar to how these older houses have been built. Two thirds of the face work is in brick and then one third of it has got a modern version of weatherboard, which is actually a concrete board called Eternit board made by Marley. All the way through the material it's dyed and you effectively never need to paint it or do any of the maintenance with it. It's pretty good for minimising heat losses and it actually looks like wood. Slightly unnatural wood, as in the exact same figure on every plank but it really does look, a very acceptable finish, I feel.

The materials were really chosen to be sympathetic. The roof is slate. I'm very pleased with the roof. I actually do go out and stare at the roof occasionally. I think they did it so nicely. [Kingsley laughs.] What else is there? Window frames. Yup, we did put quite a lot of effort into finding window frames. These ones are triple-glazed. They are from Germany and they were dramatically less than getting them locally. I don't understand why that is but they work incredibly well. They have all those clever features that the continentals have where top hung windows can actually fully open or partly open or have a security opening position. Just fantastic, really. It all turned up exactly on time and all fitted perfectly.

The skin, incidentally, as in the brickwork, the face work, is attached to the SIPs panels with brick ties in the conventional way so it's not just held there by gravity. It is secured in the same way that brick to breezeblock is secured, but in all honesty the SIPs panels hold up the bricks, not the other way around. That's probably a surprise to people.

Ben: I know that you're going to have a very energy efficient building at the end of this, airtight as well. Did you ever think about taking it even further?

Kingsley: Yes, I had a look at quite a lot of the technologies from air source heat pumps, ground source heat pumps, solar collectors, PV . . .

Ben: Passivhaus as well. Did you look into that?

Kingsley: Yes, I did look at that. The zero carbon house is another one I looked at, the Huf Haus, but trying to temper budgets and reality, what I ended up concluding was that really **the money is better spent making sure you don't need energy than in having very fancy low cost energy**. So we've put a lot of effort and money into making sure we don't lose heat in the first place rather than having a cheap source of it.

If you put in heat pumps and all these sorts of things, they are quite expensive and to be honest I didn't want to have lots of very clever technology that I was going to get anxious about in 5 or 10 years time when I'm not quite so young and virile and able to maintain it myself. I don't want to be claiming on warranties of companies in 10 years for £30,000 bits of kit somewhere in the ground [Kingsley laughs] which is exactly the time at which I'm not going to be up to the stress and worry of it.

We've stuck with very conventional technologies so we have got a modern high efficiency condensing gas boiler that drives the underfloor heating and the hot water, etc. We have put in a cylinder that will accept solar so it's got an extra coil and we have put in some cabling to allow for PV at a later stage. So if the efficiencies of those things continue to improve, I might look at them further down the track. They're certainly worth making sure you can retrospectively add them without having to change cylinders and knock holes in the walls to add wires and things.

Really what we have achieved there is a hermetically sealed box with an air management system, a heat recovery system and very low heat losses.

We change the air fully every hour and a half. We bring in nicely new atomised air, etc. We save 80% of the heat of the air we expel. So we lose very little heat yet keep a healthy building and I think that's going to be a very manageable way of keeping a warm building using conventional kit.

Ben: What is the airtightness going to be?

Kingsley: Well, I haven't done that test yet. We know it's going to be very good because one day we had left the door open when it was very cold, closed it at the end of the day. The next day was a warm day and when they opened the front door, this freezing howling gale came out of the house [Kingsley laughs] which must mean it's really holding temperature. It just happened to be holding it the wrong way round that day.

Ben: Fair enough. Let's talk about some of the other aspects. I know that getting yourself connected to the main suppliers was quite difficult, so I'd like to hear your story behind this.

Kingsley: Yes, I must admit that that was really when having a contract administrator came into its own. I never thought to ask Duncan, who kindly fulfilled this role, whether his hairline moved back or not. It didn't occur to me to ask. I better check!

People have got the notion that dealing with the planners and getting planning permission is the bit that's going to be thorny. In actual fact, it took a bit of time but that wasn't really terribly thorny. The bit that has proven incredibly difficult was to coordinate the utilities to come and do their part. To get it to happen all at the same time frankly was almost a religious experience because UK Network Power would appear to be an authority that nobody's able to reason with. So, even though we could get the gas and the water companies to be pretty cooperative we were really struggling with UK Network Power.

My advice would be to anybody doing a build, would be to get that bit applied for at the same time as you get your planning permission. I know that seems absolutely ludicrous but in fact they have a 90 days notice period, even from when they say yes, they're going to go ahead. So, if they came along on January 1st and said yes, they won't be doing anything until April because they require to do an advert in your local paper to notify people the road will be dug up, etc. I'm not suggesting they'll come on the 91st day because I don't think that's very likely either. They

may well be so rammed with work that they've got this luxurious position but from the client's point of view you need that one to be bagged because not having electricity reliably is going to be a problem.

Even if you sort of cheat a bit and have a builder's supply put on, at least to get the trench work done and everything onto your site, I'd get that bit bagged.

I think we were very fortunate that in the end the highways department were extremely helpful, because they are the one that grant the licence for road closures. They appear to be the only people who have the ability to convince the electricity company to cooperate, so if they say there will only be a licence granted for this period, that's it. Then I think that seems to concentrate the minds wonderfully but yeah, that would be my tip. Have a contract administrator with a full head of hair and get him to do the electricity at the start. [Kingsley laughs.]

Ben: Just looking at the project overall, now. Is there anything that has surprised you or any brilliant advice, other than obviously what we've mentioned already, that we should add here?

Kingsley: Yes. Well, for me, I was very fortunate that I have an interior designer lady and she gets on very well with my contractor. So they both shared my vision, as it were, and clicked really well. If there was something that Greta felt was a good idea for us to do in the kitchen, to have the guy who was building the kitchen on side with her has just made life so much easier. Instead of you having, how can I put it, people with different agendas, to have people that really click from the start is just wonderful. I would recommend this team to build anything [Kingsley laughs] because they just are fantastic and totally client-centred.

I think if you have builders working for you that put themselves out to get on with your neighbours, I think that is a fantastic thing. That has really helped for me because we have had pressure points with parking and things in this lane and to have builders that always politely get the authority of people whose houses they might be blocking in or whatever, even if it's just for two minutes, it just sets the flavour for the whole project. People know they can come over and ask somebody to move a van and be politely received. Those little things count for an awful lot. You don't want to be living in a house where, you're the guy that brought those people that used foul language or weren't nice or

didn't tidy up after. That would be my tip for a nice happy after taste.

Ben: Kingsley, thank you very much for sharing the experience of building a house, commissioning that, being at the other end of the garden. When do you move in?

Kingsley: I think it's going to be in about two months' time. My daughter is the fashion guru on what I'm allowed to put up for curtains and sofas and things. So until she's back from her travels, I'm in stasis but yeah, a couple of months.

Ben: Thank you.

Kingsley: Thank you.