

Episode 124

A contemporary Passivhaus home, built with SIPs – with Paul Newman from Potton

The show notes: www.houseplanninghelp.com/124

Intro: My guest today is Paul Newman, the Self Build Director at Potton. We're going to be hearing the story behind their SIPs build Passivhaus, which is the latest addition to their show centre in St Neots. As part of 'Self Build Live' they have also been inviting members of the public to see how the site is progressing.

First, however, I asked Paul to tell me a little about Potton's history.

Paul: The Potton business was established in 1964, so this year we've been going 51 years. We celebrated our 50th birthday last year. And we produced our first self build house back in 1981 and the prototype is actually still outside the factory gates, stood now being lived in completely unrelated to the business and I hope very much they're enjoying the home.

Since then we've helped people design, or we've designed and built over 6000 self build properties for our customers. And that originally started with a portfolio of 12 designs, but has now expanded and we've got a back catalogue of over 12,000 different designs that we've produced over the years. And these days, because of the way the market place is, we dip into that portfolio for about 50% of what we do, and then modify it. But the other 50% is completely bespoke design and that architectural flexibility is something that we've added over the past 18 months or so.

Ben: It's interesting, going through my mind just then I was thinking custom build or self build, so you actually cover quite a bit of ground?

Paul: We do. For us the boundaries between custom build and self builder are pretty blurry. And we're very active in the custom build market. It's a very new market, still trying to define itself a bit. Our approach has been to stick fairly close to our core, so instead of creating designs for self build customers and then securing their

planning permission, making the building regs application and providing a package of products and services to those customers, our approach to custom build is to work with land owners, generally family land owners, on an exclusive basis. And we secure outline planning permission on their sites for them with design left as a reserved matter. We then find customers for those sites who then buy the land from the individual landowners and then we work with them to provide our normal self build package. It sounds complicated but it's actually relatively simple.

Ben: We want to talk about one specific project at the moment which is the Passivhaus. So can we begin, how often do you start to think about ooh, we should be doing something different, something new?

Paul: We have at the moment four and a half show houses I like to think! Well five and a half show houses in fact because I always forget the one that we have down at Swindon in the National Self Build and Renovation Centre. Up in our St Neots Centre we have four fully furnished, completed houses. The first three were built in 1992, or the show centre was opened in 1992. Since that time those houses have been refurbished a couple of times each, more than a couple of times probably, and in fact the most popular, the Gransden show house, was refurbished last year.

The market for self build is changing like most things increasingly rapidly. Four years ago we took the decision to design and construct the last show house here, a Wickhambrook barn. And we constructed it to achieve Level 4 of the Code for Sustainable Homes, which we thought at the time was a good target, a good performance level, that was going to become very applicable to our customers. Unfortunately the government have somewhat reneged, or have completely reneged on the Code for Sustainable Homes, and it's now been ditched as a vehicle, which is a little bit frustrating.

So probably about two years ago now, we thought right what can we do next. We really need to move ourselves on as a business and help our customers see something different and we decided we'd construct another show house. The idea came to me I guess that if we were going to do something different and not just build another house, then Passivhaus was the obvious place to go.

Ben: When you're doing this and knowing that the building is going to be repeated, you're going to have this on multiple sites, how does that affect what you're trying to create, because you've mentioned about

flexibility of your products, but if you put this Passivhaus on different locations what does that mean? I'm trying to untangle it in my head at the moment.

Paul: I'm not so sure, and having said this I'll obviously be wrong, I'm not so sure that this particular design will get repeated exactly as it is. Early indications are that it's very much a Marmite design and that's actually a deliberate thing. We're getting people walk into it and go this is absolutely wonderful, and equally we're still at the construction stage so they can't see that much. Equally we're having other people walk into it and going oh no I really hate it, it's not for me at all. And that's absolutely fine.

The aim was to challenge ourselves, to challenge our customers a little bit, so if it doesn't get repeated somewhere else I'm not that worried about it. What I probably think will happen is people will take it as a base case and will evolve the design. We've certainly learnt an awful lot during the process and I guess we'll talk about that in a bit. And we'll evolve different design forms based on the Passivhaus, but not necessarily repeat it.

Ben: Let's look at the design then. You've got your plot, we don't have to worry about that because it's on the show home site, how did you begin to take things forward?

Paul: Unusually for us, what we decided to do was to work with an external architects practice, and we worked with HTA Design. They're a practice that we've worked with extensively in the past on the volume contracting side of our business. They have a long standing interest in low energy homes but are not worldwide, or not renowned as Passivhaus experts. Experts in low energy, yes, and sustainability, yes, but not in Passivhaus. That suited us fine actually. We trust each other as businesses implicitly. We've got a lot of history with each other and for us that meant they were a good choice.

We did work with some specialist Passivhaus experts, who are based down in Plymouth who are probably pioneers in Passivhaus, who are pioneers in Passivhaus in the UK. So we went to them for little specialist bits of advice, just to make sure that we were doing if not the right thing then acceptable things.

Ben: What's the brief then, the size, the type of house you're trying to create?

Paul: We gave the architects a brief. We wanted a family home, we specified a size. I think we specified about 170m². We've actually gone over it somewhat and the house started growing.

And we've probably followed a fairly normal private architectural commissioning route where we asked them to come up with three concept designs for us, and then reviewed those, went through them in some detail, and picked one ultimately and developed it.

The one we picked was probably the most complex of the three and sometimes on my darker days now I do worry that we picked, that we could have made life a lot simpler for ourselves than we have done. It's not a bad thing, and it was something we deliberately set out to try and push the standard fairly hard, to make sure that we broke away from... Passivhaus has a little bit of a reputation as producing boxy designs, very simple boxy designs, which certainly can be pleasant on the eye but are not always that way. But we wanted to challenge and push that a bit. We've certainly done that and I have a few scars along the way to demonstrate it.

Ben: It's always interesting because I want to build myself a Passivhaus and I too hear that you're not really constrained, you've obviously got the points that you have to hit, the airtightness target, this that or the energy demand. And yet it does sort of draw you towards making simpler buildings doesn't it? So this is intriguing. Maybe some of these lessons will unfold then.

Okay, so we're underway, you've got the design that you like. I mean presumably you are thinking well we would like something that could be repeated?

Paul: It was... Yeah, it's one of the things that we were interested in, would our customers repeat it, could our customers repeat it? When we actually constructed the Wickhambrook, which was the fourth show house here, the barn to Code for Sustainable Homes Level 4, we didn't really think that that would be repeated too many times or taken as a base case for people then to develop their own designs, or develop further their designs from. But reality has proved somewhat different and sales of designs based on that are actually going really really well.

We'll find out what happens with the Passivhaus design in due course, whether people build from that, whether they don't. I can see it being used as a base case and then people evolving things from that.

Ben: Can we talk about the construction type, because I haven't actually visited many Passivhauses that have been built with SIPs so this is quite interesting. It's interesting too because my production company Regen Media did some of the filming and I actually saw some of that happen, so can you explain how it evolved?

Paul: The Kingspan Tek building system which is a Structurally Insulated Panel based building system, we've used that for about the past 10 years on our self build side. We've been using it for about the same period of time as part of our volume contracting business and we've used it there to construct a large number of low energy buildings and a very small number in comparison of Passivhaus buildings. So the Structurally Insulated Panel system does have a track record of being used in Passivhaus buildings.

The Kingspan Tek system actually is certified by the Passivhaus Institute as well so it is accepted as a building system that can be used. The Passivhaus standard actually is construction method agnostic. It doesn't care how you build. For us the choice was simple in that we wanted to use a high performance system, one that we know through experience that we can deliver very low levels of airtightness in, and so for us that's why we chose the Tek building system.

Ben: What are the pros and cons then of Structurally Insulated Panels?

Paul: The pros are that you can build the structure very quickly on site. One of the pros that I don't think has yet come out into the market place is that because the bulk of the insulation is encapsulated in the panel, it doesn't get subject to thermal bypass in the same way that fibrous insulations perhaps on masonry builds might do if the building is constructed not perhaps quite as well as it could do. So it provides a thermally robust solution, something that can go up quickly on site.

One of the downsides perhaps is that the systems can have limitations in flexibility on site. You really don't want to be changing your mind about what a room shape is going to be once you're on site. You need to do all of that sort of work at the design stage.

Ben: And I guess that's something that you take into account because you know you're dealing with SIPs.

In terms of the other elements, this was obviously working with HTA. I mean how did you source all of the various products that you were going to need in order to achieve Passivhaus?

Paul: When we build a new show house we talk to partners in the supply chain and see what new products they've got coming up, got coming forward, and we see if we can incorporate those into the build for them in return for a little bit of financial support. In terms of a free product basically. So it's really a matter of looking around, what's new.

In this case at the moment we also decided to see what we could get from our parent company Kingspan Insulation, so where possible those products have been incorporated into the build.

We've worked closely with our window partners at Kloeber and Passivhaus is a new venture for them as well. They've brought to us a Passivhaus certified window which was a new thing, a good thing, and we've also worked with other longstanding partners to provide servicing solutions. So with Totally Environment Homes for the MVHR and the hot water services in the building, and with our kitchen partners at Callerton.

Ben: Let's switch this over slightly because this has been part of Self Build Live which is a series of events which you have put on and I think this is very interesting because not many people have this opportunity to go and take a look at a build multiple times really as it progresses. So how has that gone down really?

Paul: Self Build Live was quite a new concept for us. I think probably a fairly new concept for the market place. When we built the barn to Code Level 4 we did open up the build at a few stages but they were very pre-defined, also very limited in nature. We didn't particularly publicise them that well so consequently the take up wasn't very good.

For Self Build Live for the Passivhaus build we've publicised it much more effectively, it's been marketed very well. We've run a website along it, we've had yourself come along to film it on a few occasions as well and that's been good. We've had a particularly good response to it.

What we're finding is there's a lot of people who actually are just interested in the building process, so want to come and see how a house is built. For them the fact it's a Passivhaus is almost an irrelevance. They're coming to see a build, coming to go on a building site and it's allaying some of the fears that they might have about the whole process. For others it really is about the Passivhaus nature of the build and there are definitely some people

who are multiple visitors and I'm glad to say that some of those are now turning into customers for us.

But there are also some people who come along multiple times who are most definitely not going to be building with us. And that's actually fine as well. We're quite happy with that. It was something we always accepted and knew was going to happen and we hope that those people have learnt something about the process from coming to see us.

Ben: Well you put on some really interesting talks and education courses which I know that, again connected in with the video side here, I've been impressed that you put on that. So it might be worth explaining in case anyone wants to come and see one of these.

Paul: We, for our 50th birthday actually, we decided, which was back in 2014 I guess now, we decided to launch something called the Self Build Academy. The Self Build Academy aims to take people in a fairly non-partisan way through the entire self build process from how to find a plot of land, how to work out whether the piece of land you've found is indeed a plot, take it all the way through to how to manage and start your build on site and how to finish things off on site.

So at every part of the stage of self build we've aimed to develop some educational material that provides self builders with what they need. Some of it's fairly light touch. We operate some coffee mornings really which we call networking events but they really are a glorified coffee morning with a 20-minute or half hour talk, and then about 2 and a half hours of questions and networking and cake and tea and coffee, and that works really well.

Some of them are more information transfer seminar type situations and then the onsite related courses don't quite have an exam at the end of them but are pretty intensive, 2 days, sit down around a table, a small number of people, and go through every step of the build in quite some detail. I wouldn't say that we've quite finished or developed a complete portfolio yet but we're getting there. We've added more material progressively and probably by the end of this year we'll have what I can consider a complete portfolio and then we'll be just trying to refine and improve the course material.

Ben: Does this actually help self builders, and I talk as someone who's trying to be a self builder? Or do you find that they just get stuck in this oh I can't find land, or oh I can't finance this?

Paul: The I can't find land question – we've really tried... we're very much aware our livelihood depends on self build customers finding a plot of land that they can then subsequently get planning permission on. And it's a little bit embarrassing that it's taken us almost 30 or 30 odd years to come to that realisation and do something about it.

Two of the key courses actually are how to find a plot of land and how to appraise a plot of land. The how to appraise a plot of land course goes into quite some technical detail about what's a plot, what's not a plot, what's going to remain a field forever or for a long long long time and is therefore not worth buying. And to accompany that course we publish, free of charge to everyone that comes, a little guidance document that says how to appraise your plot.

So those two courses have been quite critical in helping our customers, or potential customers, find plots of land. And again the Self Build Academy is open to everyone, so you don't have to be a Potton customer or even consider yourself a potential Potton customer to come along. They're free to all.

Ben: Let's get back to the Passivhaus and you mentioned that this has been a learning experience, so can we go through some of those things that you feel that you're learned? If you can remember them?

Paul: I can remember some of them all too well! What we've done is we've come up with a building form that's quite complicated. We started with a rectangular box and then allowed the architects to cut chunks out of it. And whilst we've ended up with a design that's pleasing, it's got a lot of junctions in it.

We've got a valley roof as well so from a thermal bridging perspective those junctions have actually been pretty tricky to resolve and to be thermal bridge-free. We've worked very hard at that with our supply chain partners and have got there but a simpler building form would certainly have helped with that.

We've also, one of the other key things you don't really notice until you perhaps get upstairs into the building, is that whilst it's a two storey house and because it's roofs are primarily mono-pitch, it's actually lower than the two storey house next door which is not one of ours on a neighbouring plot. When you go into the first storey rooms, typically bedrooms, they are, there's an awful lot of head height in there and the windows on that first floor are awfully tall and we would have made life a whole bunch easier if we'd lopped

off 18 inches off of the build. But that's something we didn't realise until I've stood in it one day and thought blimey, that's a bit taller.

These things you learn as you go through. There are some good things as well. We've used an innovative self adhesive breathable membrane on the build and that's contributing very positively to our airtightness. And we found the airtightness target of 0.6 not too difficult to achieve. Our first test actually is no secret. We pulled from memory, 0.68 and then after a little bit of messing around which took about an hour in total, found some schoolboy errors, we got that down to 0.6. Did a smoke test and then did an airtightness test again in public and actually pulled the 0.5 figure.

Ben: Obviously a lot of these are refining the design, so I'm interested too in the roof light that you have. Do you have any concerns about overheating?

Paul: Overheating was something that was an issue at the early stages of the design. When you're designing a Passivhaus, one of the things we've learnt is that when you're designing a Passivhaus you should start modelling from day one to see how the building is performing in the PHPP model. The Passivhaus Planning Package.

One of the things that at the early stages showed up was that the building did have more than, a tendency a little bit more than was desirable to overheat. So we played around a bit with overhangs and reveal depths, and critically the one thing we found that made a massive difference was very carefully specifying the performance of the glazed units within the windows. And actually now I can't remember the specific number but the building has, theoretically against the PHPP model, has very little tendency to overheat. Time will tell whether that's right of course or not. The windows have been installed mostly during winter periods so we haven't had huge long periods of sunlight but so far it's remained plenty cool inside and that's with it being airtight and without any ventilation.

Ben: Are there any other lessons that you feel that you've learned on this project?

Paul: I think for us there are two major lessons. One is in engaging really early with the supply chain to make sure that they understand what you're trying to achieve, that they have the right products available and that for the key product elements that they have the appropriate certifications in place. We did try and engage early but the lesson has been that we should have engaged earlier and

should have got some of our orders placed earlier. That's our own fault and that lesson is well and truly learnt.

The other one is that we chose to work fairly sensibly with sub-contractors who we were familiar with, sub-contractors who've worked on hundreds of Potton houses in the past and we really did find that we had to hold their hands very tightly in terms of what was required with regard to Passivhaus performance. And just the quality of construction work that's necessary to achieve that, and that's not something that's going to be unique to us. That's something that everyone is going to experience. At the moment there simply are not enough Passivhaus experienced sub-contractors out there, particularly in the self build sector and for the standard to grow and for construction costs to drop, then that really is something that is going to have to change.

Ben: Let's tie this all up then. I'm particularly interested, you talked about people who'd been coming and having a look around, that first group of people who just wanted to see a house built, did Passivhaus even leave a mark on them or do you think that they just want to build a house still? What is that permeation like?

Paul: What we're finding at the moment is that when you mention Passivhaus to potential customers they get very excited about it. And then for some of those people that excitement maintains and it's something they want to follow through on, and they definitely want to build one. But there are other people in there who when you explain it to them in a little bit more detail start to back off just a little bit and say I'm interested in energy efficiency but what I really want is just an energy-efficient house, I'm interested in not having big fuel bills in future but I think Passivhaus might be a commitment too far for me.

And what I think we have now done is work out one or two step back points from a full on Passivhaus specification to try and meet the needs of customers who want to build low energy, who want some security over their fuel bills in the future but not able to commit themselves or are unwilling to commit themselves to a full on Passivhaus build. What we must do for them is to make sure that any step back points we offer are coherent.

Ben: When this building is complete it's going to be the first Passivhaus show house in the UK. People might have had opportunities to visit friends if they'd known or to go via the Passivhaus Trust, but that's quite an interesting position you might find people seeking you out.

So does this change your business at all or is it just business as normal?

Paul: I think perhaps Ben we don't really know the answers to that question yet. Time will tell but I think that we will see an increasing number of people interested in very low energy homes and the Passivhaus standard in particular.

We know from our experience over the past 8 years that we're getting asked more and more about energy efficiency and the cost of running a home over its lifetime than we ever were in the past. So for a lot of people the emphasis is shifting, they're still very much interested in good design and having the home that looks right and fulfils their needs, but now their focus is shifting again to energy efficiency. So I think we'll see a gradual change and hope very much that the Passivhaus and what we've learnt from it will put us in good place for years to come.

Ben: Well Paul, I really appreciate your time today. It's been really interesting to learn about the house and I know we're going to link up all of those videos and the website that's full of information too, so thank you very much.

Paul: Thank you Ben.