

Episode 142

What is a Passivhaus Designer? – with Marine Sanchez from Enhabit

The show notes: www.houseplanninghelp.com/142

Intro: Continuing our theme of looking at some of the professions involved in building a house, today we're going to be talking to Marine Sanchez, a Passivhaus Designer from Enhabit. As well as being a Certified Passivhaus Designer herself she also provides training for others wanting to become accredited.

I started by asking how she came to work in high performance construction.

Marine: That goes back to university more or less. So I studied general engineering in France and then realised that I wanted to do something with the environment, with engineering and sustainability. And that's where I found something around sustainable buildings. Went to Oxford Brookes to get a Masters in Sustainable Buildings and then started working.

Regarding Passivhaus, I started working in the real world and the buildings were not delivering how they were supposed to and at university everything was working so well! So I was like hang on a minute, there's something in there that doesn't quite work! So studied and understood a bit more about the performance gap, meaning that buildings don't deliver the way they're supposed to and Passivhaus was one of the answers, so that's where I started digging a bit deeper and go down that route.

Ben: When did you become a Passivhaus Designer?

Marine: Four years ago I think.

Ben: And why did you want to be one? What does that help you do?

Marine: That's a tough question. So it gives you this extra knowledge and the Passivhaus training to get to the accreditation of being a Passivhaus Designer, really goes back to basic. It's not about

understanding a software or something like that, it's understanding the physics of how a building works. So really going back to scratch makes you, gives you really solid knowledge and probably makes you a better designer.

Ben: So is it about going on a course that shows that you've understood all these concepts?

Marine: Yes. The certification is about yeah, understanding of a concept. So the first step is obviously to do the course and take the test which gives you the title of certified Passivhaus Designer, but the second step is then the experience and then you have to put that in practice and probably get a bit of help on the few first projects until this becomes like a kind of routine and it all goes okay.

Ben: What's the timescale and how does it work? Could I do the Certified Passivhaus Designer course or do you really need to be at a certain level to make it happen? I'm not going to do it, don't worry!

Marine: Well actually the course tends to last for about two weeks, so two chunks of one week. So this is quite an intense training but I'm actually a Passivhaus trainer on one of these courses, so I can tell you a bit more.

We get quite a wide range of people. We get quite a lot of architects. A few engineers. And it's quite nice because over the last few years we've started having structural engineers, M&E engineers. We even had some house owners that wanted to learn a bit more. So that's quite intense for them. I wouldn't recommend it but it's really interesting. So yeah, anybody can do this but there is a lot maths and physics behind it to really understand how a building works.

Ben: So you're building on top of a profession really? This is just another qualification? It wouldn't be you going straight into this having not done anything in construction before? I know you've said you've had some cases of that.

Marine: Yes, you're right. I think it's a matter of building on top of a profession and it's quite nice that you don't have to be only an engineer or only an architect to become a Passivhaus Designer, so that's the nice thing about it.

Ben: Okay now, I need some clarification on... We have Passivhaus Designer, Passivhaus Architect, Passivhaus Consultants. What is the difference between all those?

Marine: So there's actually not a lot of differences technically from the Passive House Institute in Darmstadt. There's only two qualifications: Passivhaus Designer and Passivhaus Consultant. And these are almost like there is no difference between that, it's just a matter of what type of degree you had when you were back at university. So people should not pay attention to that.

The only thing to remember is in terms of people being like having a certification, you have Passivhaus Designer / Consultant and that's going to be your building physics engineer or your architect right. This is the person that does the design. Then you have your Passivhaus Certifier. This is the independent person that will review your design and give you, like tell you if your building can be certified or not. And then you have Passivhaus Tradesperson who are the people on site that get trained to work really well with low energy buildings, so these are the only kind of three differences that people should remember.

Ben: How do you work then as a Passivhaus Designer? When do you get involved, what's the work that you're doing?

Marine: It's much better if we get involved from day one because you've done quite a lot of podcasts already so you know that...

Ben: Everyone wants to be involved from day one! Yeah, I know.

Marine: True! It makes it easier because designing a low energy building, no matter what its shape, its form and its function, it's quite easy if you know that you want a low energy building from day one because you can work around it and the low energy aspect is not going to constrain you.

If somebody does a whole design, work quite a few months between an architect and a client, and then come to us as building physics consultant saying can I then please have this building as a low energy building, then it costs a lot of money to try and retrofit the low energy aspects onto a build.

So in terms of being a Passivhaus Designer, yes you want to be involved from day one. Your job would be to guide the entire design team, meaning the client, the architect, the structural engineer, the M&E engineer if you have one and quantity surveyor as well, as to what type of concepts you want to work toward. You want a very efficient fabric and a few things like this, so trying to guide them during the first stage of like feasibility study and things like that.

You would probably also do the first PHPP model, PHPP being the Passivhaus Planning Package which is the software that you use to design Passivhaus buildings. And give your input during the feasibility stage and then refine all this input towards exact performance and exact products and specifications for detailed design before then giving the support that is needed to the team on site if ever they are new to low energy buildings.

Ben: So it sounds to me on the whole as a client that I might not necessarily come into contact with you, or would I do because of this integrated team?

Marine: I think you should because it's important that the client realises what Passivhaus is and what type of impact it has on everything. Because even if you've got a really good team working together I feel that the Passivhaus Designer has a tiny bit of a strange role in the fact that anything on the design could have an impact on how the building performs. So even if a Passivhaus Designer is not an architect and won't do architectural design, is not an M&E engineer and might not do the ventilation and lighting design, any of these aspects could impact on how your building performs and the Passivhaus Designer is the one to promise how the building is going to perform. So you do need this overall view and this very broad understanding of what everybody does in the team, and I think that's why the client should also know that as well.

Ben: Are there cases where the architect is actually a Passivhaus Designer or how often is a Passivhaus Designer brought in?

Marine: Okay. Being a Passivhaus Designer you don't have to have a certain profession to get that. So it could be generally either a building physics engineer or an architect and we do have quite a few cases in the UK where quite a few well known architects are also Passivhaus Designers.

In terms of how often you bring a Passivhaus Designer in the process, it depends on the client. Some of the clients know that from day one and we get in from day one and help the team. Some of the clients go down the route of thinking about the building they want to build but realise about low energy building aspects later on and we get brought on a bit later.

Ben: What happens if we don't use a Passivhaus Designer but still want a Passivhaus?

Marine: That's a tricky question! Technically you can. You don't need a Passivhaus Designer to get a Passivhaus building, however having a Passivhaus Designer on board, it brings the experience and the knowledge that comes with it because if you wanted a Passivhaus building and would go all the way through designing and building this building without people that have done it before, then you would spend all this money and spend all this time and then see at the end if it reaches it.

Passivhaus is for me, it is very good. It's the end of the scale of what we can at the moment deliver in terms of low energy buildings. And it is a very difficult target. It is doable but you don't achieve it by chance. And I feel that if you don't have a Passivhaus Designer on board you would be taking a lot of risk to potentially still have an amazing, comfortable, low energy building at the end, but you would probably be just above the target that you need to reach for having your building accredited as a Passivhaus building and therefore miss the target that you wanted to have.

Ben: Let's say, as a lot of people will still be in this situation, that perhaps someone in the team, an architect or builder or so forth hasn't got the experience, if you have a Passivhaus Designer is that actually going to be enough experience to get you through this or do you really need one of your key people to have done this before?

Marine: If the entire team knows about Passivhaus obviously it's easier. Everybody speaks the same vocabulary and you don't have to probably explain as much and explain why you don't want thermal bridging or why airtightness is so important.

But if you have only one person that knows about Passivhaus in the team, if you just have your Passivhaus Designer, it's doable because yes Passivhaus is a standard and people want to have this certification, but at the end of the day we're just working with low energy buildings and the concept behind it, it's not magic, and it's not rocket science. It's literally just paying attention to detail. That's all it's asking.

And Passivhaus is a very nice platform to put this team into, like asking them to pay attention to the details and that's how you know your building will deliver what you said it would.

So I think just having one Passivhaus Designer might make it a bit more time consuming but it would be a very good learning curve for the entire team and it's definitely achievable.

I've been in this situation quite a lot of times and it works. It works and the team I think gets better for it because they then kind of spread the love of Passivhaus a bit further and they go on to the next project and they're trying to do it again.

Ben: We've talked a lot about Passivhaus. What happens if we're just trying to make an energy efficient home and it's a bit more woolly? Would we have a reason to incorporate a Passivhaus Designer?

Marine: I personally think so. Maybe some people might differ but that's why I'm talking about Passivhaus as a platform. When I say Passivhaus I mean any low energy buildings because it's the same solution to achieve any type of standard you want as a low energy building.

We work with Passivhaus, we work with EnerPHit which is Passivhaus for refurbishment and we work with AECB silver which is slightly more relaxed but the same type of certification but now created on a UK basis rather than a German one.

And for me no matter which target you want to achieve it's still the same solution. It's just paying attention to the details and maybe not pushing as far but it's still the same concept that you're using so I would say yes you would like to have a building physics consultant and Passivhaus Designer on your team just to help you pay attention to the details.

Ben: What is the difference between a good Passivhaus Designer and someone that's not so good? Or are they all good?

Marine: Okay. I think you can't describe people as a good Passivhaus Designer or a bad one.

Ben: Why not? Because physics is either spot on or not?

Marine: Well physics is simple. It doesn't change so in terms of Passivhaus Designers they've gone through the training so in a way they should all be good because they should understand the physics of how a building works and as I said physics is not going to change no matter which country you're from, you know where you're going.

But in terms of experience I think a good Passivhaus Designer is somebody that has the experience because physics is all good in practice but then you also have to deliver it. So having done a few projects means that people have tried a few things, try a few different construction methods for example, have worked with

different builders and might have different ways to approach things and things like that. So I think the more experience you have the better it gets.

Ben: What have you learnt over time then, since you got that accreditation to where you are now? I know that you work for Enhabit which are very clued up, particularly on retrofit but also for new build, things like that. So how has it developed for you in this role?

Marine: I've learned a lot through a different range of projects. I think the main thing is that Passivhaus is a team sport. It's not something that somebody can achieve on their own. If you have a team, if there's only one person that wants it, which could be either the client or the Passivhaus Designer or somebody else, if the rest of the team hasn't bought in, it won't work. It's a team sport.

Everybody needs to buy in and when this is the case then it becomes really easy because everybody sits at the table and I think that the Passivhaus Designer will explain what concept and what targets we're trying to reach and then ask every single person at the table, the structural engineer, the architect etc, what are their requirements and see if they meet. And if they don't meet then start working and find a compromise.

So I think that this aspect for me is the most crucial one, and I think it's one that I really enjoy as well, because you get so much collaboration and working with all types of different people with a lot of different backgrounds and different experiences and I think that this is what makes it really enjoyable.

Ben: Do you find in the work that you do that you're working repeatedly with the same architects and so forth, or is it just next person, next person, next person?

Marine: It's a bit of both because clients, if you start your journey right, I'm pretty sure you probably did the same, you're like "I want to build a house, I'm going to talk to an architect." So generally the architect is the first one at the table.

And when that's the case and you have an architect and a client then for us as Passivhaus Designers and building physics consultants, we get different teams every time. And it's okay because we try something new with every single one of them. But at the same time when we get clients that have done a bit of research and know that the low energy aspect will be the most

important one, then they come to us before going to anybody else. And then we get the chance to actually work with the people we like working with and so we pick the team that goes nicely! You work with your friends and it's always nice and easy hopefully.

Ben: If we come to the Passivhaus Designer first, is there a risk that we're putting the architecture on the line here? When you say you like working with particular people, do you want to push the architecture too or is this all about numbers?

Marine: No, see you're right. So we have a lot of different architects that we like to work with but actually as a client when we have a client coming to us first what we tend to provide them with is actually two or three or even four different architects that we like working with. Saying this architect does a lot more of retrofit, kind of really traditional, this architect does a lot more in terms of new build and a bit of different futuristic architecture and things like that, until we get the client to pick which architects he would feel more comfortable working with. Because it is about architecture first but it's also actually about the person you're going to be working with and you need a good interaction, so yeah. We let them pick that. So the architecture should never be compromised because of Passivhaus.

Ben: Where should we find a Passivhaus Designer or as you said should we lead in on that architect first? Although did you say that? You said the better ones come to you first.

Marine: The easy answer is...

Ben: I like easy answers, but I'll hear the difficult one too!

Marine: The easy answer is that you go onto the Passivhaus Institute website and every single accredited Passivhaus Designer is listed there. So that's the easy answer.

In terms of actually how it happens in practice, I feel that the Passivhaus world is a small community and people know about each other. So I think as soon as people start reading about Passivhaus and obviously checking buildings because that's what they're interested in at the end of the day, you start reading about different companies and seeing what type of work they do and these companies tend to have Passivhaus Designers and if they're engineers then they'll have a range of architects they've been working with and vice versa. Because you have Passivhaus Designers that are architects but they sometimes decide, you know an architect has already more than enough to do on a job so they

might decide not to actually go down to the exact PHPP modelling or thermal bridging calculations and things like that. So they will have engineers that they're happy to work with. So I think as soon as you start looking a bit you'll have a few names popping up.

Ben: You've talked about PHPP and so forth, on a typical week what are some of the tasks that you're doing? How are you splitting up your time?

Marine: That's a really good question! I think it's actually really interesting because we don't have two days that are exactly the same and I quite enjoy that. So as a Passivhaus Designer there's a few different tasks that I do and any week will be a combination of these different tasks.

So we do have obviously desk-based work which is modelling and this is mainly using PHPP for assessing how your building is going to perform and you've got a few other tools as well such as thermal bridging calculations or moisture transfer modelling and things like that. So these are the softwares that you will use on your own at your desk.

But then you're also part of a team and you also work on projects. So you then have a part of your week that will be dedicated to client facing and interaction and teamwork with the design team, structural engineer, QS, architect, and potentially the builders and everything else.

And then you also have a really interesting part of your week which is hopefully going on site, because it's nice doing design but for me I fail at my job if my design is not implemented on site. Because at the end of the day being a Passivhaus Designer it's about climate change and helping the planet in addition obviously of low energy buildings and comfortable homes. But climate change is also behind all of this and if my design is amazing but not implemented on site it's actually not that good.

So being on site and supporting builders and some of them might not have the experience so giving them the tools of understanding the concept that we're asking for and making sure that your design is well implemented and obviously checking the design but also testing it, so that's where you've got all the airtightness testing and MVHR commissioning and things like that. That comes to mind, so making sure that we're there from A-Z so that when we give the keys to the occupants we're like yes, I promise you your building will work.

Ben: And what are you looking at when you go to site? What are you actually checking visually or is it just a chat just to sense whether something's going up wrong?

Marine: A bit of both. So making sure that your builders are comfortable with what they're supposed to do and that they're happy with the drawings and it all makes sense, but it's also yes, you are checking, looking for things.

In terms of typical things you would look at, obviously insulation plays a big part in low energy buildings so you want to make sure that the insulation is very well installed, that you're not spotting any gaps or anything's missing. It's linked to thermal bridging because a thermal bridge is your insulation not being continuous, so making sure that this doesn't happen and in tricky areas where we had to compromise a bit, making sure that it's done properly.

The next thing that comes to mind is also airtightness because airtightness is very important and yes we do test it but before testing it we're installing all this airtightness layer with different materials, using a lot of tapes and things like that. So making sure that the tapes are well done and adhere really well.

So just making sure that everything is installed according to the design and I think with teams that are not very experienced with Passivhaus yet, making sure that they step up their game a bit, because obviously Passivhaus is about QA. It works so well because we have the quality assurance that it has been done the way it's supposed to be done and that's why it works. That's why it delivers what it says on the tin. And if you look at how we build as an industry at the moment in the UK, we're doing okay but we're not there yet in terms of attention to detail, so it's a matter of making sure everybody is stepping up their game so that we get to deliver a really good building.

Ben: Maybe we can just finish up on a case study, something that's going through or gone through at Enhabit where we've got a Passivhaus Designer. We obviously don't want to be repeating ourselves, but is there anything you can explain?

Marine: Yes. So you start with the concept design and on this case it was a very particular case where the architect in question is also the owner and throughout the course of getting his Passivhaus building and the building is on site at the moment, he's actually also done

the Passivhaus Designer course, so that's been a really interesting one.

Ben: Does that help him as well? He thinks ah, I can see it.

Marine: Yeah, he's done the course and says everything makes so much more sense. I'm so ready for this. But yeah, in terms of involvement so because he was the architect and the owner at the same time, he and his wife came to us with a concept design saying this is what we're looking for. We want to do this with the main house, add a bit of an extension here and you know.

They started approaching us with a concept design for architecture but asking us for support in terms of what type of insulation strategy or things like that we should go for. So even before doing any modelling we had quite a few meetings to discuss about strategy to explain, very quickly for example, that on a retrofit going with internal wall insulation tends to be a lot more difficult than external wall insulation for diverse reasons and things like this. So we help them before even starting modelling, discussing about the strategies that they would use.

Then the next step is the feasibility study which is saying okay, we might not have all of the details but we have an idea of what we're going to do with everything. If we put this into PHPP does it work or does it not? And you make it work obviously because we need to achieve certification. But you fiddle around until you find the exact performance that you're looking for, for every single aspect of the build.

And that normally gives you a kind of performance specification that you want to achieve which then lets you move to detailed design and the point of detailed design is to meet every single performance where you've set yourself through every element. So if you said my wall needs to achieve a U-value of about 0.15 you then need to go down to the detail, at every single layer, every single material, so that you get an actual build that will go up on site that reaches what you want. And so you refine and finalise all these elements before then going onto site.

And they've been starting enjoying doing the design as well as doing the work, so at the moment they're up on the roof putting in some insulation and playing with airtightness tapes to see how it works in reality, how you deliver it.

Ben: You've seen a lot of projects, no doubt worked with lots of self builders, is there anything that might help a potential client? Just a key piece of advice?

Marine: As a designer my recommendation would be don't rush the design. If you want a low energy building it will take a bit longer to design. It's okay but I think that if people don't rush it through design and really get it right, I actually think that your build goes actually so much smoother. And it could potentially go quicker as well because you don't have to sort things on site and things you haven't thought of, or compromise on the target that you wanted, which is what happens when people don't actually work enough on the design before going to site when they're trying to reach low energy buildings. So yeah, that'd be that.

Ben: Marine, appreciate all of the information that we've had today. Thank you very much.

Marine: No worries. Thank you very much.