

Episode 167

What is a healthy building product?

The show notes: www.houseplanninghelp.com/167

Intro: Choosing what materials to use on your project is a big decision. Yes it will influence the look and feel of your home, but the materials will also come with an embodied energy. And then there is the contribution to the indoor environment to consider. So, finding products that are good for your health and well-being is not exactly straightforward.

Simon Corbey from the Alliance for Sustainable Building Products (ASBP) has a lot of experience in this area and is going to explain how to make wise choices on which products to use.

I started by asking him to tell me a little bit about his background.

Simon: I'm a general practice chartered surveyor. I became a chartered surveyor back in the nineties and then went off travelling for six months which turned into four years, came back and thought if I'm going to work, I need to do something meaningful.

I looked around and ended up volunteering for a place called Construction Resources which was London's first eco-builders' merchant. And I spent five years working there. Originally, I was in the warehouse and driving around forklift trucks and then worked my way up to being natural paints finishing as a sort of specialist.

I'm not sure if Construction Resources is somewhere you ever went to but it was over three floors, lots of cut-outs, lots of details, solar panels, rainwater harvesting, a fantastic resource. A one-stop-shop, if you like, for any eco requirements. Lots of training, lots of very skilled people who I still know.

We did quite well as an organisation and turned over about a million pounds a year. But unfortunately, the guy who set it up was a bit of a maverick and perhaps a maverick that was almost setting himself up to fail. So, unfortunately, it all came crashing down around our ears.

But it was five years where I, as a natural paints finishes specialist, I dealt with all sorts of complaints with people who were phoning up or coming in with problems just using conventional materials. Conventional paints in particular and certainly flooring, carpets being a massive one.

So, I would get regular complaints from people saying 'I felt terrible' and a few people ended up in hospital. One chap nearly died apparently. This concept of healthy products was something I was focusing on long and hard, I suppose, back in the nineties.

Since that time, I've been working for BioRegional. I did a BedZED thesis so, I tried to impart lessons from BedZED. Spent three years taking about fifteen-thousand people around BedZED and talking about the sustainability, the winds and things that perhaps weren't so good at BedZED. Then from working at BioRegional, I started working with Jon Bootland at the Sustainable Development Foundation and the Good Homes Alliance.

The Good Homes Alliance was focusing very much on homes, particularly new build homes and we very much started to look at the performance gap and tried to understand why this gap was happening, how we measure things, things like getting protocols for co-heating tests and thermographic testing and monitor testing through walls, that type of thing. So, quite techy, building performance evaluation stuff.

And then in 2012, I had the opportunity to switch to another Jon Bootland programme called the Alliance for Sustainable Building Products and we launched at the Palace of Westminster in 2012.

Probably the group arose partly due to a real frustration with the BRE Green Guide. At this time, it was felt it was really hard for people to work out what was a sustainable product, where was the green wash, where's the detail, where are the numbers, where's the proof. And the Green Guide was seen as one way of beginning to answer all those questions. But we felt that there were so many problems with it, that it really, basically, wasn't fit for purpose. And so this frustration brought together a bunch of people. We launched and we've been working ever since.

We've done about fifty events since that time, most recently our Healthy Buildings Conference and Expo which was in January at University College London. We had a hundred and sixty delegates there. We've got twenty-two speakers talking about healthy products and all of those presentations are available on our website.

So, my role at ASBP is to organise events. We're a knowledge sharing organisation and also to lead research and to try and act as a bridge between researchers and business. So, making sure that researchers are operating in the real world and they're actually doing research that people want and trying to distil that information through to the wider industry. That's our role.

Ben: You've covered a lot of ground in that one answer. Let's go back to just the implications of health. Is there a common set of symptoms that we're trying to address or is it just health across the board?

Simon: I think that everybody is an individual. And so, as a result of that, everybody's needs are slightly different. So, what will affect one person, because they're chemically sensitive for example, just won't affect another person. So, unfortunately, it gets quite complicated, quite quickly.

But at the end of the day, my conclusion from all of this, is to use what's called the precautionary principle. I'm sure it's something that you're familiar with but basically, it means that if in doubt, if you don't really know what's in the product, if you haven't got a full statement of content, if there's a slight doubt in your mind, perhaps don't use that product and find a product that you can trust where there is a full declaration of content et cetera.

A healthy building of course is a very complex matrix. It includes all sorts of disciplines from acoustics – noise is one of the major complaints, especially in converted flats – through to daylighting, through to ventilation, through to what we're calling source control. That's controlling the amount of chemicals that come into a house in the first place.

Effective source control alongside effective ventilation are two parts of the same coin really, to try and look at a healthy interior.

Ben: In some respects, is the choice of material taken out of our hands by who we work with? They will present solutions and routes to go down.

Simon: No, I'm not sure that's the case. I think you as an intelligent client can get on top of this. And you're the client. So, if you're self-building, it's up to you to choose the materials that you like, that resonate with you and also to choose materials that are healthy.

I think all of that process is entirely possible but it does require a little bit of effort.

Ben: Can we talk through some of the products? You mentioned a little while ago how sometimes you'll get a gut feeling about a product and maybe it's best to steer clear of that. But on a best products approach, things like straw bales, they're the things that resonate with me. Or lime render, clay – is it all of these sorts of materials that are the best to use? Because they can get more expensive as well. There are all sorts of trade-offs here.

Simon: I suppose the first thing I would say is just because it's natural, doesn't mean it's healthy.

There are plenty of products, natural paints for example, that have quite high levels of VOCs within them, whether it be dryers, whether it be the oils themselves.

You could argue that all products are natural. They're all made from natural materials, naturally occurring on our planet. But then increasingly those products are processed and then they're also joined up with other products to become a system. And then it becomes much harder to start to classify that system with regard its health and wellbeing benefits.

Let's just take insulation as one example perhaps if we may. There are all types of natural insulations available and if you look at their embodied carbon and if you look at their environmental impact they're all pretty good.

So, just one example, let's start with wood fibre. In most cases, it's a waste product. So, they're collocated with forestry workshops and in most cases, it's a waste product binded with steam at heat, with no additional glues. So, held together with its own glues. It's a great product to handle, of course. You don't need gloves. It's a great product to cut, it's easy to cut. But because it's very dense, as I said, it deals with this concept of overheating particularly well.

If I were a self-builder, I think it's a case of what resonates with you. So, if you've got some sort of farming background, it may be sheep's wool insulation might be the product that ticks your boxes. As I mentioned, sheep's wool is particularly good at dealing with formaldehydes and being a scavenger for VOCs but it also deals with moisture and soaks up moisture as well.

It may be that hemp is your product and it was compulsory to grow hemp in the UK. We'd made hemp products all the time, for everything. But there's very little hemp that's grown now in the UK. But this will change. So, if you look at the natural insulation market in France and Germany, it may be around four or five percent of a

market. Here in the UK it's point zero one of a one-billion pound market.

So, part of the work of the Alliance for Sustainable Building Products is to try and change that. And we think that drawing out the benefits of these products is the key way to do it. So, we're not selling it necessarily on its sustainability or the fact it feels nice, we're selling it on the fact that it has additional benefits to other products. And it's trying to get a common lexicon for those products.

So, let's talk about overheating by one way of an example. The concept is, of course, that it's hot outside at one or two o'clock in the afternoon and you don't want that heat entering into the building. You want to delay the passage of that heat into your building. That's all down to the thermal coefficient of your products and that's a lot down to do with the density of the product, how much stuff there is.

You can imagine, I suppose, that as the sun heats up, it gradually warms up and works its way through into the building. But with a dense product like wood fibre, it delays that process. So, you're not suffering from overheating in the summer.

Another particularly useful attribute of natural fibres is the way it deals with moisture. Obviously, we create a lot of moisture in our lives, through cooking, through washing, through general living, and that moisture has to go somewhere. Of course, if you're relying on your ventilation system, that's all fine and good but certainly, there is an argument for letting your insulation take up that moisture and buffer it so, your relative humidity stays between forty and sixty.

That's important because within those forty to sixty confines, that's the healthiest. You'll find that bed bugs don't flourish so well in those relative humidity limits, dust mites don't flourish so well, mould doesn't grow. It has all sorts of benefits just trying to keep the moisture within your house or workplace within those forty to sixty relative humidity levels.

Ben: As self-builders, we obviously have a lot on our plate. How can we compare building products when we might have things suggested at us? Is there an easy way, not to get too drawn into it because I think our time will be precious?

Simon: I would say that leading architects are developing their own pallets of products that through years of experience, they've grown to understand have a healthy and beneficial effect on their indoor air quality.

Just by way of one example, Architype, who are members of the Alliance for Sustainable Building Products, they have really gone with Passivhaus in a big way. So, they're building homes, they're building schools and they have refined their pallet of materials through that process. So, now they'll only use a limited range of paints, insulations and material systems. They've been doing quite a lot of measurement and monitoring to understand how this process is working or not working. They are then informing themselves and their practice and refining their pallet of products as they go along.

But I would suggest that perhaps there needs to be some better collaboration than that and there are a few tools out there that exist and one of them is an eco-label. We are UK representatives of an eco-label called natureplus. Natureplus is quite well known on the continent. It's based in Germany but certainly in Germany and Austria, it's something like five-hundred-million euros of products have got natureplus certificates on them through the year.

The idea of a natureplus product is that the product will only be granted the certificate if it's from a truly abundant source. So, then natureplus has a detailed lifecycle analysis so you can look at the embodied carbon of your product. But also, all the products are third party independently tested in a laboratory for chemicals and off-gassing.

The natureplus criteria commission sets very hard standards to reach and in some cases, no products are natureplus certified. The idea of natureplus is that it's on the top of the triangle. It's trying to pull the market up and so, it represents really only the best products.

Natureplus products are on a database and you can look at all the embodied carbon information, you can look at all the health and wellbeing results but at the end of the day, if you know it's a natureplus certified product, you can pretty much guarantee that it's fine and fine to use. It saves a lot of work and research really.

But of course, natureplus, by way of an eco-label, is quite new to the UK. For most people, if I mention natureplus, they're still looking at me blankly. But we know it's a twenty-year process, like FSE, to bring natureplus into the UK and to grow its market recognition. It's a long-term process for us but certainly, I think that self-builders, architects desperately need this type of tool because otherwise, there's a lot of work required in sifting through information that providers produce.

In many cases, suppliers of materials are not manufacturers so, they don't really know what's in the product. So, when you start asking them taxing questions about what's in the product, they have got literally no idea. So, it can be quite a frustrating, lengthy process.

So, if you're working with an architect – and I understand in your case, you are working with an architect – I think they will have developed real expertise when it comes to a pallet of products which they will consider to be healthy and good for you. So, that's where I would start.

Certainly, if I were self-building and I'm working with an architect, I will put that pretty high up on my list of priorities.

Ben: You've mentioned Jon Bootland already today, and one of his roles is with the Passivhaus Trust. So, it's interesting in the Alliance for Sustainable Building Products, that for me, is also another really important part.

So, where is the balance here? Because we know that we want to do it right across the board but can we get both ticks?

Simon: Well, I think that Passivhaus certification is a fantastic system and one I support. But I think it's the next logical step for Passivhaus to have part of the Passive House Planning Package (PHPP) looking at embodied carbon. So, the natural material Passivhaus, if you like. I see that as being the logical next step within the process for Passivhaus, to enable that.

There are many Passivhaus producers. I've mentioned Architype for one, David Gale, Gale and Snowden Architects are another. They're all focusing on Passivhaus with natural materials. So, it is very much possible to get there and so, the two will meet. But it's just reminding everybody that they are inexorably interlinked.

Ben: Are there cost issues? Is that what's driving our route? Perhaps we end up having a bigger house than we wanted, which I know in my case I tried hard to get a smaller house but once you've got the land, you're stuck with the economics. So, I might have to consider things that perhaps I didn't want to when I first started.

Simon: Yes. As in life, there are all sorts of cost issues. These products are generally more niche and so, the economies of scale, which will kick in if they're produced at much larger amounts, haven't really kicked in so much.

Just to use one example, wood fibre. France has invested heavily in wood fibre production. At least seven or eight new factories opened up sometime last year and so the prices are dropping in France.

You will find, of course, they're dropping a little bit in the UK but with Brexit and the pound slumping, that certainly hasn't helped because quite a lot of these products are still being important. So, it is a crying shame.

I do think that will change over time and certainly, that's part of our work, to try and work with the wider forestry industries and farming industries to connect these endeavours, I think.

So, yes I do think there is a cost element but at the end of the day, I think the costs between products is dropping, I think the difference between, say, polyisocyanurate insulation and natural insulation is much less than it used to be and I think that can only get cheaper, natural products.

So, yes, at the moment, I think there is a cost premium to pay. In the big scheme of things, yes of course it's always a balance against that budget.

Ben: Is there anything that you want to ward us off that is just not a product that we should be using or we should be trying to minimise on our project? And maybe explain why, if there are some contenders here.

Simon: That's a slightly unfair question, I think, because quite often you'll have the right product but in the wrong place or installed incorrectly. And so, you have a product that's absolutely fine that ends up causing moisture build-up, for example. Again, the right product is fine but you've got to install it in the right way.

I don't think that we know enough about this subject. There's not been a real level of research that's been investigating products, off-gassing, VOCs and indoor air quality. There's very little scientific evidence. So, we're only just now, I suppose, starting to unravel the connections between products and indoor air quality. But of course, with products, there are many hundreds within your average house and so it's very hard to be specific about one product and then a health effect of that product.

Another thing to bear in mind is that VOCs are often in products because they have some sort of functional advantage. There is a tension between using low VOC products and quality. It's a tension that I don't think will ever go away. But there are issues where, for example, some external paints which are low VOCs have been

proved to be rubbish and blistered and need repainting within a year or two.

It is really a case of relying on your architect or talking to your architect or other professionals, to understand which products are durable and low VOC and which products are not.

Ben: What else falls into this conversation that might be relevant to us as self-builders?

Simon: Well, certainly if you're Passivhaus, lots of the issues that the big house builders are struggling with – quality and airtightness generally – I think lots of those problems go away because you're dealing with a set of architects that know what they're doing, you're dealing with a package that is very carefully worked out.

So, you'll know if there are any issues about overheating because PHPP will tell you this. You'll know if there are issues around ventilation and ventilation rates, for example. But as I mentioned before, I do think that healthy interiors are all about good source control but it's got to be about effective ventilation at the same time. So, if you're on a Passivhaus, you will be requiring some sort of MVHR system.

That is a system that I would suggest that you perhaps need to satisfy yourself that it's got the right controls on it because controls can be complex. You've got to satisfy yourself that it's properly installed and so, commissioning guidelines and having a sign-off commissioning process I think is really, really important.

We did a bit of work with the Good Homes Alliance going into a range of social housing and checking out the MVHR. We found failure rates over eighty percent.

Ben: I actually remember seeing it at your conference, one of the big companies talking about setting up a ventilation system in one of their buildings and trying to make sure everything went exactly right. And at some point, there was a big error in that. So, why is it so complicated?

Simon: My general argument is that if it's a little bit complicated, there is a real danger that it can go wrong.

It's only when you go back in to do some sort of building performance evaluation on your building, that then you start to understand that things are not working quite as well as you might imagine.

Even solar thermal, for example. Again, we did a range of studies working with housing associations, looking at solar installations. And again, we found quite a significant range of problems. And it is really to do with there's a lack of standards, I think, and professionalism for installation, perhaps less so now. But certainly, with MVHR, it's quite often the plumber that's dealing with it and actually, dealing with air is a very different ballgame to being a plumber.

So, quite often, it was basic things like the ducting being squashed, ducting being pushed between impossible gradients and so, it was all squashed and so, the air change rate was nothing like what it said on the tin.

It is a case, I think, of a sensible architect will plan in exactly where your MVHR system is going to go and making sure that it's easily accessible to change the filters but also, to make sure that all the ducting is carefully lined so there are not difficult radiuses which cut down your airflow. And if I were you, I wouldn't sign-off that MVHR system until it had been tested and proven, so that you're satisfied that it's working.

I wouldn't be paying my MVHR installation's bill until such time as I had made sure that it was checked and professionally signed-off. I think that's really important, there's no doubt about it.

Ben: We're getting close to the end now and I'd like to wrap up, but I just want to make sure, is there anything else that we need to mention as part of this conversation?

Simon: There are all sorts of things, I suppose. I'll just give you a couple of examples.

I've been looking at formaldehyde just recently and trying to do a briefing note to try and upskill all of us really, as to what it is, how it occurs and how to specify for low formaldehyde products.

We know that from testing of a school in Manchester recently, they found formaldehyde levels ten times over World Health Organisation limits, twelve months after the school was occupied.

Formaldehyde is a ubiquitous gas. It's all around us. It's in my breath, it's in your blood. Low levels of it is absolutely fine and I think we even need it. But high levels of it are a no-no and it's a known carcinogen.

So, in this particular school, we don't know where the formaldehyde came from, we haven't had access because as you can imagine,

it's very sensitive. It could well have come from flooring, carpets, furniture – all of these are common sources of formaldehyde. Certainly, if you're importing particleboard from China, for example, you may find that formaldehyde limits are off the scale.

There is a process whereby you can specify and I'm sure your architect knows about this, how you can specify for low formaldehyde. But as I said before, it's only really the fact that as we do more indoor air quality testing – and my personal feeling is that perhaps we should put it into building regulations, much like air tightness testing because it's cheap, it's something that's easy to do, there is guidance in Part F of the building regulations around VOCs and limits and so on, but maybe that's not the next logical step. I think it'll take ten years or so.

So, yes, there is an issue around formaldehyde but it is quite easy to specify low formaldehyde products but you just have to think about it.

And just one more quick thing, I have been also looking at PVC windows. I've always had a bit of an issue with PVC windows but, of course, I've sort of been looking again at the way we make PVC windows. And perhaps it's not something that you think of when you're looking at specifying and buying them. You're just looking at the performance, you're not really thinking quite so much about the material.

As a quick reminder, PVC windows are made from fossil fuels of course and chlorine is used to make PVC. And chlorine is a highly energy intensive product to make and the process of making PVC in this country still relies, in certain cases, on mercury filters. There are still a number of companies in the UK that have a licence to off-gas mercury into the environment.

So, you have to think about not just the product and how it forms but perhaps also, where it's come from, what it's made from and is this really restorative and environmentally friendly product.

I think it's worth trying that type of approach for pretty much all that you do.

Ben: Simon, thank you very much.

Simon: Thank you very much, sir. It's a pleasure and I look forward to listening to how your project commences.