HOUSE PLANNING HELP

Episode 193

Should you specify uPVC windows? with Simon Corbey from ASBP

The show notes: www.houseplanninghelp.com/193

Intro: Specifying windows for a newbuild can involve many different factors. As well as performance there are aesthetic issues and questions of durability. And of course there is the eternal matter of cost. But what of the environmental impact of the windows and the materials used? Simon Corbey from ASPB has been researching this and returned to House Planning Help to discuss his findings. I started by asking him about the name, is it uPVC or PVCu?

Simon: Really good question, and I have to say that I'm not sure. I see it displayed both ways. I prefer uPVC, but you do see it as PVCu a lot. So the 'u' is the unplasticised and the 'p' is poly, which is of course is a girlfriend of a friend of mine (laughs). I prefer to write uPVC, but it's equally… It seems to common to write it the other way around. I don't know if you've got any thoughts on it?

Ben: Well, what about PVC just on its own? Is that connected or is this something different? I know we're talking about a mix of chemicals that can be used in various ways.

Simon: So plastic is either rigid or flexible. So PVC, if it's flexible, it will have plasticisers in it. Unplasticised PVC clearly doesn't, so it removes the issues around plasticisers. But what you do have in it is something called stabilisers and they are a range of metals, so lead and cadmium. I think the best thing to do is to call them 'plastic windows.'

Ben: Plastic windows. I can deal wth that. Really are we talking about chemicals and that we're concerned about these chemicals?

Simon: I have to think that the consumer perhaps doesn't really think about this when they're looking to specify windows, replace windows. I'm not sure that we as a consumer, really think about plastic and where it's come from and all the issues around it.

So if you do a search of the research. When it comes to indoor air quality, plastic windows have never been indited in any way in a negative indoor air quality, so the window itself is quite benign. So

there may be a range of chemicals within it, but as a user your most pressing issue generally is around cost and plastic windows are generally cheaper. At the moment of course they're refining their designs and their styles and they're making windows that look exactly the same as timber windows and heritage windows and conservation windows. Yeah, so there's quite an aggressive marketing campaign by the industry. It's well funded, of course. It's the petrochemical industry.

That's a long answer to a short question.

Ben: You mentioned cost in there and I can totally understand that. Is that really one of the key issues of why it's taken off? Are there other benefits?

Simon: I think there are others, Ben. I do think it's sort of a lexicon thing. Plastic windows, yes they're cheap, so that's a good thing. That's a tick in the box. Plastic is seen as being man made, I think, and there's an assumption that that's somehow tougher and more robust. So timber will somehow rot and you've got to keep getting up a ladder to maintain it and somehow plastic is man made. That's an interesting concept that we think that somehow that's more robust because I'm not sure it is.

Again, I've been doing some work for ASBP trying to understand a bit more about how you draw a comparison between plastic windows and timber windows and the life cycle and the manufacture is clearly a big impact. So yeah, polyvinyl chloride, so chlorine is a large part of that, and chlorine, of course is used in swimming pools. So in our water as well, so it's a common thing and doesn't strike any concern into anybody's hearts, I don't think.

But at the end of the day we need to understand that plastic windows have an incredible impact on the environment. So yeah, 95% of the chlorine that's used in the UK is manufactured in Cheshire by a company called Ineos. They produce 80% of the UK's chlorine. To make chlorine, they make it mainly from sea water, it's hugely energy intensive. They're one of the largest industrial consumers of electricity and gas in the UK and their plant in Cheshire, I think it uses more electricity than Liverpool.

So plastic windows are manufactured widely in the UK, but these impacts are not really considered.

Ben: Maybe then we could look at the life cycle. You would assume that if you have these plastic windows, they're going to last longer.

You've already alluded to the fact that people think wood will rot. So can you do a side by side comparison as you see it?

Simon: That's where we're trying to get to. We're trying to do a balance comparison between timber and between plastic. There's a huge… You could do a podcast just on quality alone, I think. Much of the window science really has come in from Europe. I used to work at Bedzed and the windows came from Denmark. The quality of timber windows in the UK, I think is increasing, but there have been issues around the windows from housing associations just informally. So quality is an issue.

Ben: What makes a good window?

Simon: It's all about, I would say, functionality really. The window is your first port of call when it comes to ventilation and all good homes and good indoor air quality is based around good ventilation because there's a lot of moisture that we generate in our homes and we've got to let that moisture go into the environment. So opening a window, of course, is the best way to do that, keeping the house ventilated, and how you can open that window easily. Does it slide open? Can you clean it easily?

And maintenance – people have a concept that plastic windows last a long time. The formation of plastic has changed through the ages. We've been familiar with it since the '60s, but the formulation has changed quite a lot over that time and the industry has made great attempts to clean itself up, there's no doubt about that. But they're also known as an industry to be quite litigious. (Laughs) I have checked my PI and that's fine, but I can tell you a little story about that.

Ben: Go on.

Simon: I used to work at a place called Construction Resources in Southwark in London back in the late '90s. It was a place a bit like the Design Museum. We had solar PV roofs and it was over three floors. Fantastic place. We did seminars on things like windows and life cycle analysis and persuaded this company, Scottish Housing Association, to cancel an order for some plastic windows that they'd put in. This got back to the powers that be. So we then started getting legal letters to Construction Resources. There was a threat of court action and being sued. So it's quite an aggressive process and my colleague who delivered the lecture was having letters sent to her at home. I have checked my insurance and we're fine!

We know that plastic is made from petrochemicals. I think we know that. We don't really understand this thing about chlorine quite so much. We get through a lot of plastic products. PVC is 5 million tonnes every year but 8.6 million tonnes of chlorine was used to manufacture PVC in Europe in 2015. So it's hugely energy intensive. From a life cycle analysis it's a terrible, terrible thing.

Ben: Let's talk about that far end of the life cycle then. What do you do with them when you finish with them?

Simon: Well, it's very hard to find reliable data for the UK to understand what the recycling rate for windows is just now. Of course there are quite a lot of issues about recycling old plastic windows into new product because old plastic windows and then some of the products, the stabilisers that we used at that time, lead and cadmium, have been phased out. These are substances of very high concern as concluded by Reach, which looks after the chemical registration process through Europe. There are major, major issues about recycling old product into new product, but if you do an EPD of a new product you'll see that there is an allowance for lead and cadmium within that product. 0.1 milligrams admittedly, tiny quantities, but it is there on its Enviromental Product Declaration.

The Scottish Civic Trust suggests that 3% of windows are recycled into other products. We understand that it's somewhere between the BRE suggest according to the Green Guide that the UK average is about 15%. I suggest that's high because there's just too many issues around it. It's more expensive and more chemicals are required and there are bigger risks, so it's a difficult one.

Ben: What about fire situations? Is this going to be any worse than wooden windows?

Simon: It is going to be so much worse, yes. I didn't really realise but the inhalation of toxic smoke is the biggest killer and the largest cause of injury for fires. I think it's fair to say that it's a neglected area of fire science and fire safety engineering.

There was a suggestion that this information – toxicity data – needed to go into construction products' regulations and so should be available for everybody and for energy calculations and so on. I think it's fair to say that this science is evolving. We hope to do some tests, some fairly simple tests, comparing one against the other, but just at this moment in time all the testing institutes are particularly busy. I'm sure as you know, as a result of Grenfell.

What I felt was really interesting was that certainly in the USA, there has been this interesting tie up. The Healthy Building Network is a network a bit like the Alliance of Sustainable Building Products, but in the USA. They've got an interesting tie up with the Fire & Safety Community and they have made a very strong plea to stop using plastic products full stop. So I have started to make contacts with Kent Fire and Rescue and the London Fire Brigade and there is some research underway but it's early doors I would suggest, this type of testing.

Ben: Is this because of the precautionary principle that you mentioned last time round?

Simon: Yes, I'd like to think that is definitely part of it. I think there's a growing interest in health and wellbeing generally. Toxicity is a huge issue.

Ben: If you were about to replace your windows, how would you go about that job?

Simon: That's a challenge. Of course it all depends what type of windows you want. I have timber windows and these windows are 120 years old and they're going strong. They're a bit leaky but they're okay as far as I'm concerned.

Ben: And what about for a new build property?

Simon: Of course we're trying to understand, I think, of course windows contribute towards the fabric's performance and they're an essential part of that. Triple glazed windows are appropriate, I'm sure, and double glazed windows. Building science has come on a lot and new values have come down, so both plastic and timber windows can achieve Passivhaus Trust certification.

Actually, from a performance angle, the top quality is there. You could make honest comparisons across both products, but certainly from a maintenance angle I have a sense that timber windows do have a finite life cycle and as I think you probably know, sometimes you'll see a slightly yellowing of plastic windows after a while. I'm sure you've noticed that.

Ben: It's interesting. My history of housing, this one that we're renting at the moment has uPVC windows and I was looking round the estate. It's maybe an '80s estate, and virtually every house does. So there are downsides as I see it. We talked about life cycle. We talked about the life span. One thing Lloyd Alter from TreeHugger was always saying is that "they're called replacement windows because you have to replace them every 10 or 15 years." There just seems

so many downsides to it that it's surprising to me. This must be cost that's making it so widely used.

Simon: It is and I suppose really the price of oil and gas still remains stubbornly low. We somehow always assume that we're going to run out and prices will continue to rise, but that's probably not the case.

Ben: What is stopping timber windows from competing on price?

Simon: It's a good question. I suppose if you think about it, there's a process of gathering timber and processing it and sawing it and milling it. It's quite energy intensive. There's quite a process. It involves a lot of effort and actually making PVC is quite a cheap process. It's simple to do, if you like. The raw materials are cheap and it's effective to transport them. It's quick and easy to do.

I do think that there's an opportunity for the UK to develop their building physics and approaches to making windows, but I think the average consumer is much more concerned about how the windows look and how long it's going to last. These are the main things, and how they function, how they open, how they close.

Ben: That's a valid point. With our project we've had to specify windows recently and as a self-builder I can't see why I would choose uPVC windows. It's very, very difficult. I think again, this is a mass market thing, isn't it?

Simon: It is a mass market, yeah. It's quite an aggressive, I suppose, proposal.

I met the guy who was supposed to do the Everest advert with the helicopter outside and the feather inside. It's a slick marketing campaign. The timber industry in the UK as I understand it, is quite fragmented, so it doesn't speak for one voice. There's so many different disparate interests in it, but the plastic industry is a little bit narrower.

Ben: We talked about timber. We talked about uPVC. What other materials are windows made from?

Simon: Well, there's aluminium of course. That as a product I suggest in some instances is a good specification because aluminium is very durable, but as we all know it's highly energy intensive. So from a life cycle analysis you tend to steer away from it.

You can get composite timber and aluminium windows. Certainly that's the Bedzed window rationale there. Penetrating water is the

enemy of timber, so aluminium sills, that's appropriate. It does depend very much on the building location, which rain zone you're in. All of these things you need to try and think about, I would suggest.

Ben: Is there anything else that we should consider then about uPVC? You commented, I think, at this point when we were specifying our windows and just said at least my wife didn't want some uPVC windows. So why are you so passionate about this?

Simon: Well, to be honest with you, I've been doing some deep research into this company, Ineos, and their plant in Cheshire. Something like 16 tonnes of mercury has been used. So back in 2014 they were caught dumping mercury into the Manchester Ship Canal. So this site has got a really interesting history. It used to be owned by ICI and there was reports of ill health in a small village in the early 2000s. ICI had to compulsory purchase 26 homes because there was this toxic chemical leaching from this dump. This dump has been used to make everything from nuclear weapons to World War II stuff, and actually we don't really know what's in this dump. So ICI own this site, bought up this village. They suddenly realised that there was a real long term legacy issue here and spent hundreds of thousands of pounds supporting Ineos to grow them. The government gave support and then ICI realised that the best thing to do for them was to walk away. So they just cancelled all their debts and basically gave the site to Ineos.

Today, if you look at the Land Registry, this dump has apparently no owner. So there is a completely toxic dump just there which the council don't own. Ineos have somehow redrawn the lines of their site and conveniently they don't own it any longer. It's a very murky world, I suppose, what I'm saying, Ben. I feel motivated to try and bring this to people's wider attention.

Ben: It does seem in a lot of these situations when you're specifying materials, that so much of it is closing the loop because if you're choosing these plastic windows you just don't have a connection to that factory billowing out black smoke.

Simon: No, absolutely. That's another thing.

Ben: Can we ever do it or will it always be like that, that we're just never going to learn?

Simon: Look, I think just at the moment, I think there's a real massive global campaign against plastics. Plastic (not) Fantastic. Plastic in our oceans. I think we're starting to understand that we need to use

less of plastic generally. I think at ASBP we're trying to suggest that as a society we've just got to start using less plastic through and through in all the things that we do and windows being one of those things.

Window science, of course, has moved on tremendously. There's a process where they're asatellissing wood – I'm not sure if I'm even saying that right – I think so. It's basically in vinegar and so they've got maintenance lives over 60 years.

At the end of the day I do think it's a price issue, but I think the timber industry is generally improving in the UK and I'm sure there's lots of good possibilities.

Ben: Well, Simon, thank you very much for coming on today and enlightening us a little bit on plastics and uPVC and the origins. Thank you for your time.

Simon: Good stuff. Thank you, sir.