

HPH320

Ben Adam-Smith 00:00

This is House Planning Help episode 320. Hello, I'm Ben Adam-Smith, and this is the podcast for you if you're interested in self-build or retrofit. I'm exploring what houses we should be building in the 21st century and trying to break down the major roadblocks that may get in our way.

Coming up in this session, my guest is Antoine from Kithurst Homes, and we're going to be looking at the efficient use of timber. Things like I-joists, you might hear that term bounded around, what exactly are they? Why do they work so well? And how are we embracing modern technology to cut with precision? So all sorts of benefits, speed, reducing wastage, we'll hear all about it. And a big thank you to Jae Cotterell from Passivhaus Homes for introducing me here. She said Antoine is a really interesting guy, you need to go and have a chat, which is what we're doing.

Ben Adam-Smith 00:55

Milestones have a habit of creeping up on you, don't they? And this session marks a decade of me doing this podcast, I really can't believe it. It's been a wonderful learning journey. And I'm so grateful to everyone who's spared me time to talk through things, share their knowledge. I've attempted to pass it on to you as well. And I think I knew even on day one that there's just so much in this topic, and always we're trying to look ahead, what else could we be doing, that I would never get bored. And that's certainly the case so I intend to keep on going. Initially, I had my sights set on building my own house. But that's now four years ago since it was complete. So I'd love to get involved in another development. You probably know I've said this before and I will keep on trying. So hopefully, we can get under the skin of another project here on the podcast.

Ben Adam-Smith 01:45

For obvious reasons over the last couple of years, at least, a lot of the interviews have been remote interviews. And I feel that's fantastic. It certainly makes a lot of sense when you're trying to interview people over distance. But I do enjoy getting out and about. And I'm certainly trying to do that more at the moment. Particularly if there's a building to see because that's not quite the same on Zoom. So I got the opportunity to go and check out the cutting facility at Kithurst Homes. And Jae had said this was impressive. So let me paint a little picture, you've got one building that is brimming with timber, the I-joists, the glulam beams, all the sorts of things that we're going to be hearing about. And then the other building, again, a warehouse but just eerily empty. It's because all that timber in the other building is going to be passing through. And there's a yellow and red, quite small machine in many respects, that's going to be doing all the work. It's got these blue rollers on either side, so that the timber can slide in and out under the control of the machine. And it's not in action today, which is how I'm able to get some of Antoine's time. So I started by asking Antoine to tell me a little bit about his background.

Antoine Costantini 02:56

I studied physics, working in construction as a troubleshooter for many years and I always loved timber and forestry and making, working in the timber industry. For me using engineering timber makes complete sense because you use way less timber. Building out of timber is not as eco friendly as these people want to make it look like. It is not carbon neutral. There is no building which are carbon neutral anyway. But it's important to use it properly. It's a fantastic material and you have to use it properly.

Ben Adam-Smith 03:34

You've mentioned timber, which is certainly how we're going to centre this conversation today. What timber do you use in your day to day work here?

Antoine Costantini 03:42

We use engineering timber, so LVL: Laminated Veneer Lumber. Very rarely CLT: Cross Laminated Timber. We use glulam and we rarely use soft wood. If we use a soft wood it'd be a KVH which is an engineering soft wood.

Ben Adam-Smith 03:52

And what material is this? Is it all one type of timber?

Antoine Costantini 04:05

Laminated veneer timber is like a plywood on steroids. KVH is finger jointed timber. Cross laminated wood is a cross lamination of timber a different way. And glulam is soft wood glued together.

Ben Adam-Smith 04:20

And is this a mixture of trees or what type?

Antoine Costantini 04:22

Normally you use the same tree, well the same species at least. And it depends on what you want to do and what strengths and intended strengths and what you're using it for.

Ben Adam-Smith 04:34

Now, you've got an amazing kit here at your workshop. So maybe you could paint a bit of a picture. How did you get to this stage to have this amazing cutting ability?

Antoine Costantini 04:47

So we used to cut frames by hand like everybody. We had a big chop saw. A digital carbon system where we used to cut them to usable lengths for the part we wanted. If we needed an angle, a bevel, put to that angle, cut every single path we had that and move the saw to another angle and cut all of that, so it took us for 200 square metre say, so it used to take us two and a half weeks to get everything proper, numbered, packed, everything. And when you cut them regularly you say, you know, you got human error, it's a bit repetitive and it's a bit of a nightmare. As much as I liked cutting timber! So we just had to go into more automated system. But finding the right machine was quite tricky. Some just cut straight, some just cut an angle, not many machines do what I wanted. And we went to Hundegger, which is a fantastic machine with five axes so you can do so many different cuts, and you can put a milling on top, you can do so many things. So we went to that and that same 200 square metre frame

the first time we cut it, not the same one that we used to do, but because all operate a bit different, but the same size, we cut it in three hours, instead of two and a half weeks. It took us two and a half weeks to pack it together because we find ourselves with a mountain of timber. But the wastage is really, really low, is less than 3%. It's all marked, it's all numbered and cut properly and to size. So it made our life really easy.

Ben Adam-Smith 06:32

I was going to ask you about marking so it even does that?

Antoine Costantini 06:35

Yeah, it does mark where the studs meet, where the timber made marks and then the pack number or the wall or the group, whatever you want to call it.

Ben Adam-Smith 06:44

Let's rewind to how this would start that. So you can't just expect the machine to build your house without giving it some information. So where does it start? Is it the architect says I would like to build this building?

Antoine Costantini 06:57

So we got two types of different customer. We've got customers like PH15. Fantastic company who do Passivhaus and use timber and natural product. They do all the frame design with engineering and they send us a BBX file which is a machine language file which the saw can understand and cut. 80% or 90% of the people who come to us we do that for them. So we get the drawing, either the architect wants it to be like this. Quite a lot of developers want to build or got 10 houses to build to Passivhaus and are all very eco friendly or whatever. So to fill that market, tick the box, they come to us we take the drawing, and we transfer them into our system, which is CAD work, which is a timber and steel designing software really made for the timber industry, or the steel industry. And we can get your DWG drawing, every architect can do that. Or sometimes it's a hand drawing and we transform it into a 3D, because if you think about it, a piece of timber is 3D is not 2D. So we need to tell the saw that that piece of timber is X is 150mm wide, is 250mm long is, so we talk in x, y, z. So it's 3D and convert that in number and everything into the saw and the saw will give us the right piece at the end.

Ben Adam-Smith 08:28

Now, I'm sure it will need to know what's going in. So is that changing as well what you're putting through the saw?

Antoine Costantini 08:35

Yes, so every time we send information we tell it for which part is cut off, which timber is cut. So if a joist is cut off an I-joist, a stud can be cut off a glulam or a post can be cut off of glulam or KVH. So we need to tell it which one is which one and it recognise any material, exactly the geometry of the timber. And if the timber doesn't respect the geometry, it will tell you.

Ben Adam-Smith 09:04

The machine would just say no something's wrong?

Antoine Costantini 09:06

It is very German. For that it's very square.

Ben Adam-Smith 09:11

And how do you make sure that you're feeding it efficiently? Or is that all sorted that you're actually working an hour or so down the line that you've got all the timber going?

Antoine Costantini 09:20

We know so we programme our software for the machine all online and we got what we call a picking list. So we know it's going to consume that amount of I-joists, that amount of LVL, that amount of glulam and we put them in order by size to make our life easier and just feed it to the machine. And that's it.

Ben Adam-Smith 09:39

So an I-joist, what length would that arrive here?

Antoine Costantini 09:43

13 metre.

Ben Adam-Smith 09:44

13 metre. And then how many metres would you need on let's stick with our 200 meter square building?

Antoine Costantini 09:52

Well, it depends. It's around 5,6,800 metre a kilometer of I-joist. It really depends on the geometry in square metres. It really depends on the geometry of the roof. Roofs have a tendency to eat a lot of timber. Plus the flooring, so it's an average of one and a half kilometer of I-joists for beginners.

Ben Adam-Smith 10:15

PH15 is one that I know well, having seen a project in Buckinghamshire. The whole thing just popping in every week to see the progress so that has I-beams going through the roof as well. Is that a common approach?

Antoine Costantini 10:29

It's not a common approach. It's an approach we do for years. PH15 developed a similar or different system years ago too. In this country, not many companies work with I-joist. Timber frame is more stick what we call in North America stick frame. So 2 x or 47 x 100, whatever you want to call it. And here in the UK, 140 is the king size. Everything is on an insulated wall is around 140 thick by 47 by 140 stud.

Ben Adam-Smith 11:06

So is the I-joist one of the most efficient pieces, or does it not work like that, because you need other different pieces to interact with it?

Antoine Costantini 11:15

So if we were going into a stud work in soft wood, I can build 40 to 60% more houses with the same amount of primary wood. That's a big difference. So I use way less timber than the main house and I got less cold bridge because of the size and geometry of the I-joist.

Ben Adam-Smith 11:37

And when it's coming out the other side, you mentioned before about all your timber piling up. So what happens once it's come through? Or maybe what happens as it goes through first of all?

Antoine Costantini 11:47

Well it go, it got cut, it got marked. Each company we have, we normally pack them by wall. Some companies pack them by what they call pack one, pack two, pack three, and that can be all the soleplate for example first, and after all the stud work for that source wall or whatever. So all those are packed together, we use steel bands to pack because you can recycle steel bands, you can't recycle plastic banding. Put them on there, and they are stacked and ready to be transported in curtain side truck because we don't use plastic on our packaging. We're against plastic. Plastic is killing the world faster than greenhouse gas. So we have to be careful.

Ben Adam-Smith

Yeah, I do think some people are very slow to respond to finding other packaging methods. But yeah, good on you. That's what we like to hear. And what about your team to make this happen? You mentioned your three hours for this house to go through. So how many projects do you have? And how do you manage the team of people?

Antoine Costantini 12:52

We work on flexi hours. We schedule the work as they come we're sort of first come first serve. So when we got all the final drawings sign off, we transfer it into BBX and we schedule it to be cut. But we have to talk to people on site. So either the builder owner or the developer or the architect or specifier, whoever is our customer. They give us a date of delivery and we deliver that date.

Ben Adam-Smith 13:28

So it arrives on site, is that out of your hands at that point?

Antoine Costantini 13:31

It arrives on site, it's out of our hand if it's cut for somebody else. If it's cut for us, we never send a frame without training. So if a company, PH15 for example, do their own training, we do our own training. So one of us will go on site and explain or they come if they're local or they prefer they come here and they'll assemble a wall, get insulation, play with the material, try to understand how we do it and they figure out very quickly and normally say 99%, they're super happy because they don't, because you don't have to take a tape measure or anything. Everything is marked you just have to bind it together and it works very well. We supply everything. So the fixing, the screw, the staples, the membrane, the plywood, everything is supplied because we engineer everything and everything is provable.

Ben Adam-Smith 14:25

It's a lovely clean way of building. So what skills would you say you need to if you're on the receiving end of wanting to build? What level do you need to be at and what do you need to be aware of?

Antoine Costantini 14:38

What do you have to have? It's a good place and prepare your groundwork and everything but skill wise, if you got common sense I know it's hard to find those, but if you got common sense and you know how to use a screw gun and you got a good courageous person, you can build a house by yourself quite happily or with a couple of people to help. All the parts are not that heavy by itself. An I-joist because it's so much less timber is not that heavy. If we go into big glulam for a ridge beam or lintel they become heavier, but it's always manageable. And you can use a crane when it's a full wall that we send you. When it's a full wall system, you have to have a good team of carpenters, because that is a completely different thing, it's an erection of full wall and stuff like that. So it's a bit different trade. But flat pack is we got people who put them together, they're very happy. They're the good DIYer. And because everything is marked, we just tell them, they come with drawing assembly drawings, or they know the dimensions, they know what the diagonal is for the wall. So they put it together and it work. And if they got a problem, we are a phone call away.

Ben Adam-Smith 15:56

Just going back to the efficiency side of things, why do you think construction is so slow to change? It would seem very obvious from what you're doing here, that this is a good path?

Antoine Costantini 16:10

In this country we're 25/30 years behind everybody. Because the construction in this country is driven by the big guy. So the big house builder, and they don't want to change because they know extremely well what they do. They do it extremely efficiently for what they want, it doesn't mean that it's good quality, it means that they're making a lot of money, always and they know that it's predictable. And they love it, plus, I don't want to talk politics, but they are most of them are the one who pays the bill for the poor. So you know they will have been at school together. So if they don't change, nothing will change.

Ben Adam-Smith 16:49

Now I know a lot of those major developers, there's sometimes a hybrid of masonry and timber, but right at the start of this conversation you mentioned you've got to be careful with timber that it is sustainable. So what checks are in your process? I mean, presumably you've got people that you lean on now that you trust but how do you size up where the timber is coming from and that it's manageable?

Antoine Costantini 17:13

So all our timber comes from two or three manufacturers, and Steico a German manufacturer is one of them. Because we use the insulation we use rigid wood fibre, we use blown wood fibre or mat wood fibre. The I-joist and the LVL we know they all PEFC, all the German regulation or the European regulation and we know they are people who use timber properly, they've no wastage, they use everything on the tree that, everything is shredded to make insulation, laminated to do the LVL and the I-joists they do the insulation who is using copy things so it is well documented and signed on for that

kind of thing. And that we buy from them we don't buy it from where we come in and say Do you want some timber, we don't use exotic timber. We try to always use timber that we find in North Europe because it's the best climate for that. We work with a bit of with oak from regulatory system from English oak or French oak because you don't really have much English oak these day but all our timber is PEFC certified and everything.

Ben Adam-Smith 18:30

Can you do any cutting if people bring timber to you or that's not something you like to go and do?

Antoine Costantini 18:36

No, we don't get involved with that. It becomes a very tricky part because the timber has to be such a good grade and so regularised for the saw to recognise what it is.

Ben Adam-Smith 18:49

You mentioned you can get these I-beams in, they're pre-formed and so forth. So what has it gone through to turn it into the I-beam first of all?

Antoine Costantini 18:56

So an I-beam is basically an outboard web with two LVL as flange. And so what they do is take I imagine a tree, put a spike on each side of the tree and you're going to take all the ring you're going to unfold them put them at 90 degrees to each other or lengthway, press them in the wet system and dry them, so it becomes like a plywood. And a machine cuts them to size, put a groove into this hard board and push it together and glue them so you got an I-beam. Or you got just that primary thing which is LVL laminated veneer lumber cut to size. So that is engineered so it sits along the line of when they build it and they test it after, before that so they know it's perfect for engineering because they react always the same. Contrary to soft wood with doesn't react always the same. It can have a defect in it. This is proven that it doesn't have the defect. Well, 99%. Our machine recognises that, and know that if it's a 300 I-joist, it'll be 300 all the way down. It won't be 300 on one side and 320 on the other side, and you'd be 39mm thick or 45mm wide. And it's the regularity of the timber makes it really easy to work with and predictable. And predictable is a good thing in engineering.

Ben Adam-Smith 20:22

And what gives it the strength then?

Antoine Costantini 20:26

Well, the strength is done due to the lamination of the timber. Hard board is incredibly solid. And the flange is like a really a plywood on steroids. So it's quite thick, not that thick, but it's quite thick. And it's again predictable, we know how a timber will react on strength, density strength, bending, modulus, shear and everything. So we can predict that all along it. And it's always the same.

Ben Adam-Smith 20:53

Now just getting back to your process here, you've got a very sophisticated bit of kit. Is that the end of the process? Are you ever tempted by anything else? Is there anything it doesn't do that you'd like to do or?

Antoine Costantini 21:04

Well, we, we've got a CNC machine to do the gusset, which are the web stiffener if you want to call it that. We got that. So maybe we'll invest later on in another CNC cutter to get a bigger panel. At the moment when we send a kit outside people on site have to cut by hand, the board material. So otherwise we or the panel van, the vapor block. So we're looking at cutting it here because again, the beauty of our system is when you're standing on site, you don't need to skip for a ton of off-cut. Because everything is cut, you don't need to recut anything. And that's a big saving. Most of our customers, the first thing they say is it's so lovely not to have a skip on site. For example, the roof is often the thing which is a bit tricky. People have a tendency to do a couple of trials, so they waste two or three lengths. You don't have to have that. None of that is done with our system. Everything fits.

Ben Adam-Smith 22:03

Is there anything else we haven't talked about that we should mention as part of what you're doing here?

Antoine Costantini 22:09

We only use natural material. That's our ethos. If it's not compostable or recyclable we don't use it. So we don't use any PU or polystyrene foam. We don't use plastic, and we try to preserve as much as possible the environment. That's the only thing.

Ben Adam-Smith 22:28

Well, that's fantastic. And I'm sure that's why PH15 love working with you as well, you're exactly the same ethos.

Antoine Costantini 22:34

Yeah.

Ben Adam-Smith 22:35

Well, Antoine, it's been fantastic to hear a bit more about the process and to see it firsthand. So thank you very much.

Antoine Costantini 22:42

Thank you for coming in. You're welcome anytime Ben.

Ben Adam-Smith 22:46

Head online to take a look at the show notes that accompany this session: [Houseplanninghelp.com/320](https://houseplanninghelp.com/320), where you can review the main information in our summary, or have a look at some of the photos of that magnificent cutting machine. If you've got a comment or you'd like to ask a question, you can do that within the show notes or on social media. We'll have links to all our various social media outposts. We'll link you to Kithurst Homes. And one other thing actually, if you're one of our Hub members, don't forget that we've got a full in depth video case study of Buckinghamshire Passivhaus and that's using the PH15 system which is still, I love the way how it ties

everything together, and Jae's expertise as well. So all together there, we'll put a link in for that as well. Houseplanninghelp.com/320.

Ben Adam-Smith 23:36

My call to action on our 320th episode, 10 years in, is please review us on whatever app you're listening to us from, like a couple of people have done. Like CharlieSwan23. Both of these short and I think that's fine. I don't need to take a lot of your day. Just some sort of review that helps people. "Excellent series, I will probably listen to them all." Thank you very much. And Frankly9999 "Essential listening for anyone considering an eco self build." If you can leave us a review, we'd love you forever.

Ben Adam-Smith 24:10

Next time Paul Ciniglio, refurbishment lead at the National Energy Foundation is my guest. When energy prices keep going up and up and up, is there anything you can do to stay in control? And perhaps what we're hinting to here is you really do need to embark on a whole house retrofit. More on that next time. Thank you very much for listening. The House Planning Help podcast is produced by Regen Media: content that matters.