

Episode 155

Do you really need an architect to design your house?

The show notes: www.houseplanninghelp.com/155

Ben: How much DIY or practical experience did you have going in to this?

Jeremy: Just what I guess a competent DIYer would be, as far as I went. I'd put up a few shelves, repaired heating systems and done the odd bit of plumbing. Done the odd bit of electrical wiring, added an extra socket here and there.

I had never done a building. I'd never laid a brick or done any work of that nature at all. So, I had no experience of hiring tradesmen or employing builders. That really was my biggest worry when I started.

I mentioned in the previous episode that I had a project manager in, who found a problem with the site. My reason for initially saying I'd have a project manager was because I didn't have the confidence to manage something so big.

During the year that we were buying the plot, I gained that confidence. Going through the planning process, not using an architect, having to design the house myself, get familiar with the building regulations, I felt if you've gone that far, you've done the architect's job, done the building regulations job, done the planning consultant's job, it can't be very difficult to actually manage the build. That's got to be fairly easy.

But even then, I placed a firm price contract for the ground works here. We had to initially remove about 900 tonnes of soil to get the site level, to dig it out of the hillside, build a three metre high retaining wall that's nearly a metre thick at the base to hold the ground back and because of the need to make sure the levels were all right and the drainage systems were all put in okay and everything else, I got a ground works contractor in to do all of that work. It was about £55,000.

I had him on a firm price contract. I gave him a set of drawings and a specification and gave him complete control of the site. So, I didn't need a project manager because he was project managing the job. The site belonged to him. Site security was his responsibility. I was a guest on the site during that time. He did everything to my spec but that was all agreed before the contract.

So, that was a seven-week job. At the end of that, we had a plot of land that I was now responsible for. So, I had to come over and lock up and make sure it was secure.

I then got a company in to drill a borehole. That turned into a marathon. It was supposed to be a one-week job but we had a whole host of problems. We had equipment here on site for I think nearly eight weeks, drilling the borehole. It was a nightmare. I'm not going to go into the depths of it here because we ended up in a legal battle later on. It was all solved amicably and we got a water supply but it did hold our build up for about a year and nearly gave me a nervous breakdown in the process.

Ben: That didn't put you off boreholes? Is it to do with that?

Jeremy: No, it was simply down to a whole load of errors. There was no real blame here. I think some equipment breakdowns from the company, some changes in personnel, a change of rig which worked in a different way – I think one worked in metric and one in imperial, so there were some dimensional errors. We ended up with a borehole that was twenty metres shorter than it should've been.

All told, there was nothing there that was a deliberate failing. It was just a string of errors that ended up causing us a whole load of problems.

It wouldn't put me off putting another borehole in. In fact, now I know how to do it, I've learnt an awful lot about boreholes and water treatment. I could set up a little business as a consultancy on how to get your own water supply. And this is great because you don't have any water rates. So, that's a big advantage.

Anyway, we'd got this plot of land all levelled and by this time, I'd looked around at how we were going to build the house. What were we going to build it out of? I decided early on that really timber frame gave us the very best options in terms of being able to get a build up fairly quickly because we were going to be building in the autumn and we wanted it weather-tight fairly quickly. It gave us guaranteed airtightness. We found a builder who was prepared to offer a package of an insulated foundation system, a frame,

insulated house that was weather-tight with guaranteed Passive House Institute standards of airtightness.

That's rare. Builders are struggling to get houses airtight and this company was prepared to have 20% of the total payment dependent on passing an air test. Which is staggeringly confident in building an airtight house. It is not easy to get below the Passive House Institute standards of 0.6 air changes per hour at fifty pascals. By the way, we passed first time at 0.43. So, they live up to their promises without a shadow of a doubt.

They came along. They were in Ireland and that worried me because they were in Tipperary. I thought this is going to be difficult. How do you deal with an Irish company?

So, we flew over to Dublin, the wife and I. We spent a couple of days and we drove down to Tipperary and had a look at some houses they'd built; got to know them. We thought actually, they're the best option.

They were a very good price. Ireland's had a deeper recession than we had and their building industry crashed deeper than ours did. So, they were very keen for work. I did all of the finance checks on them and they came back okay. They were a company that had built a lot of houses a year and had gone right down to building a very small number but they'd hung on by their fingertips. Really, down to one man.

Joe, the owner of the company, is one of the most hard-working grafters I've ever met. He's just tough. He managed to pull his company through it. I'm sure he made some tremendous sacrifices to do that. Having read that, I thought this is the sort of guy I want. If he's survived that, he's probably going to be a good guy to trust.

So, we trusted him. The staged payment plan meant that we had very little exposure ourselves through the build.

They laid the passive foundation, which is 300mm of insulation under the floor. There are no foundations in the ground on this house. It's sitting on a large lump of polystyrene, sitting straight on the ground onto some packed chippings and the house sits entirely on that. So, reinforced concrete rafts set into the polystyrene and underfloor heating pipes put in to that.

They're not primarily for heating. Those pipes are there to circulate water around the floor so that if one part of the floor gets the sun on it, the water circulates around and moves the heat to another part of the house which doesn't get the sun. A little pump just runs away at

about twenty watts moving heat around without heating the house up.

They put the frame on there so that the frame overhangs the insulation on the outside. So, it's completely wrapped. It's a bit like having a quilt on your bed and not having the possibility of being able to poke your toe out and get cold. You're wrapped all the way around the insulation.

So, there's 300mm of polystyrene insulation under the floor, 300mm of Solas insulation pumped into the walls, 400mm of Solas insulation pumped into the warm roof. Because the house is 'room in roof'. The two bedrooms and bathrooms are in the roof upstairs.

Ben: This was all on your specification and designs? It was quite easy to get from your ...?

Jeremy: Essentially, I drew the plans but I didn't draw any detail into them because I didn't know how to build a house. I didn't know where to put joists, rafters and things. It's way beyond me.

For planning, all you need is an outline drawing. I'm familiar with AutoCAD as a CAD package and I've used CAD at work for twenty-odd years. That was a real gift.

So, by luck, this timber frame company also used AutoCAD and so I sent them my AutoCAD drawings. They adjusted them slightly to fit their system and sent me back the detailed drawings that showed where all of the joists and timbers were. Things changed by a few millimetres here and there just to fit in with their 400mm spacing system they use. In fact, I got those drawings back and they were the ones I used for building regs approval because they showed the structure of the house and how it was built.

It worked extremely easily. I literally emailed them a set of AutoCAD drawings and they emailed me back a week or so later a set of plans for approval. I accepted them, we haggled a bit over the price which was a complete package of them coming over and putting the foundations down, bringing the frame over pre-assembled from Tipperary; it comes over in large panels that are all prefabricated there in their factory.

It's very accurately built. The tolerances are within a few millimetres, which saves you a lot of money in wastage, we found.

Ben: You mentioned haggling on the price. On what basis? How do you know the costs? Or are you just saying 'is there anything you can do for me?'

Jeremy: The haggling on price was that we put together a contract. In fact, I wrote the contract because they didn't really deal with contracts. They would just do things verbally. A lot of the building industry works with just verbal things.

Actually, I wanted a contract. I wanted to know who was responsible for one bit. I didn't want there to be any arguments down the line.

So, I drew up a contract which another customer of theirs had started with, actually that I knew, and modified it for this. I included the drawings and full details of what was and wasn't included. They priced on that and there were some things they'd added in which we didn't really want, so we knocked those out.

We literally sat in the car outside of the site, the manager of the company from Ireland and myself, with a red pen going through the contract and eventually came to an agreed figure. It wasn't terrifically expensive. The foundations, the airtight, weather-tight house frame – not plasterboards or anything inside but literally just the frame covered in a membrane to keep the water out – was about £65,000 including the garage, which is almost a double garage. So, not massively expensive when you think that includes all of the insulation as well.

Ben: As the project manager, what were you doing during this time to know that at the end of this – you're taking over or someone else?

Jeremy: No, I was taking over really from that stage on. I was coordinating with people like window suppliers to make sure that the windows arrived in the right timeframe. Because the windows have to come in quickly so that they can do the air test.

So, I sorted that out. Luckily the frame company liaised with the window manufacturer because they were an Irish company down in Cork, not too far from Tipperary so, it was nice and easy for the holes in the frame and the size of the windows to be joined together by the timber frame company and the window company talking to each other. Which helped a great deal because the window company were not the best communicators in the world.

Once that was done, I then got a roofing company in to put the roofing on. They recycled plastic that looks like dark slate, made from old car tires and bin bags. And they're recyclable and met the conservation officer's approval. Most of the roof on the south side is covered in solar panels that are set into the roof. So, there's no roof covering underneath them.

I got the company in to do that. They'd never done that before but it's very common in France. It's very good because it means that you end up with panels that are almost flush with your slates. We chose black panels so they can't be seen.

That was our only slight hitch really. The conservation officer wasn't happy with putting solar panels on. He wanted to do all slated.

Ben: Do you think there'll be a big change? I know Tesla are still playing around a little bit but they have created these panels that do just look like slates. I don't know how they've done it and how expensive they are.

Jeremy: They're not the first to do that. Solarcentury did it about ten years ago with their C21e slates.

The problem with them is interconnectivity. When you're putting these slates up, you have to wire them together at the same time. So, you've got lots and lots and lots of wiring joints all over the roof. But the way Tesla are doing it is in large, prefabricated panels which gets around that issue. I think it's probably a good way forward.

Having said that, we're quite happy with our integrated system. We've got twenty-five panels set into the roof. They're just fitted on to plastic flashing trays that are screwed directly to the roofing mat. It's the same as slates that would go down. And the slates just go round to the flashing.

So, we saved about forty-five square metres or something of slate on one side of the roof. That's a couple of thousand pounds saving. So, it made the solar panels that much cheaper.

Ben: And that is dealing with your hot water as well as electricity?

Jeremy: It's purely electricity. They're just PV panels. But we do use that to generate hot water. We use a new system that's just come out, a very innovative system, that uses a phase change material to store heat as a heat battery. A thing called a SunampPV.

It uses the same material used in hand-warmers, sodium acetate, that when you heat it up, it turns into a liquid and then when you trigger it to turn back into a solid crystal, it gives off a lot of heat. So, you can store large volumes of heat as a small volume of liquid, which then does this clever trick of turning into a solid and giving off loads of heat.

So, we've got a tiny box upstairs that is about the size of a combi boiler, which stores five kilowatt-hours of heat which it gives off on demand just like a combi boiler. That's charged up purely by the electricity from the solar panels. Whenever there's any spare generation, it is diverted into a three kilowatt heater in there that recharges that pack up.

And it's tiny. It takes up so much less space than a hot water cylinder and yet has all of that heat capacity. It will actually just fit inside a 600mm kitchen base unit. So, people have actually fitted them inside.

Ben: I remember you showed me an air source heat pump as well, when we wandered around. Surely you have already dealt with all of your needs or is there something else going on here?

Jeremy: The air source heat pump's a bit of an overkill really. I bought it on eBay cheap and we don't really need it. It was a nice to have. I thought the house would need heating. In fact, it doesn't need heating.

So, all that's really used for is it preheats a little water buffer tank which preheats the cold water coming in which means that our water that we've got running through our instant water heater that's heated up from solar, doesn't need to do so much work. So, we can have a lot more hot water.

It can put heat into the floor if we need it. It can run the underfloor heating. It's got a diverter that can warm the floor up if we need to. But in practice, we don't need to.

The thing we underestimated with this house was the heating. All of the calculations I did said it only needed a few hundred watts of heat maximum in very, very cold weather. I couldn't believe them so I ignored them and put lots of heating capacity in which it didn't need.

I didn't pay enough attention to how much solar gain you get and how you control that. And I had to put measures in to control it. We've got films applied to the outside of the glazing on the south side to reflect heat, to stop the solar gain because we were running the cooling systems to cool the house down for six or seven months of the year, which was silly.

Ben: That's interesting. We mentioned earlier how you don't have an architect. Do you think if you had managed to have that passive house architect, even remotely, that you could've cut yourself out of these challenges?

Jeremy: I'm not sure. I think with a good enough architect –I've had thirteen architects visit this build and only one had the concept of overheating in their heads. Because they're not engineers, they're not technicians, they're not scientists, they do not understand generally quite what a problem solar gain is.

I'd put some shading on to try and reduce it. That wasn't enough. I should've done far more. And we haven't got lots of glazing.

Some of the architects I went to initially and got some drafts from, they showed loads of glazing to give light, airy homes because that's what everybody wants. But of course, the glass lets in an enormous amount of heat and it's also lousy as an insulator. Even the very best triple glazing is still four or five times worse than the walls.

We've got really, really good triple glazing here. It's 50mm thick. Three layers of glass, argon filled, two reflective layers.

Ben: Was the house modelled in PHPP?

Jeremy: Yes, it was. I did model it in PHPP and I built a simpler heat loss model myself to do the 'what ifs'.

PHPP is very, very complicated and it's great for giving you a final result. But it's not very good for doing a 'well what if I change the windows from this type to that?' To do that in PHPP takes an awful lot of time and effort.

So, I built a little spreadsheet that just says what happens if I change that. And it gave me a number. It turned out that my spreadsheet result is within about ten percent of PHPP. Other people have used it and said the same thing. So, you don't need these complex models to get within the ballpark of being right.

Our biggest disturbance factor here is that we're in a sheltered valley and we have a microclimate which is about two to three degrees warmer than the average for this area. So, when I put all of the climate data into PHPP and into my own spreadsheet to predict my heat losses, it overpredicted the heat loss.

It said I would need about one kilowatt of heating in the middle of winter. In fact, we probably need about three or four hundred watts in the middle of winter.

Conversely, in the summer, it didn't predict the overheating risk. It said we had low overheating risk when in fact, because we're in this sheltered valley with very low local wind speeds and a lot of shelter

and it's a sun trap really, we do have far more overheating than PHPP predicted.

I had first sight of that when the ground works team were in. They built a big retaining wall around the back and the retaining wall is on the east and north sides of the depression in the ground. They were getting temperatures in July of over forty degrees when they were laying blocks. They were not happy bunnies. They were bringing in gallons of water. That gave us an idea that we had created a sun trap.

So, that's a bit untypical. I'm not sure that an architect would've picked that up.

I think one of the really experienced passive house people probably would've done and probably would've been able to see the problem if they'd been to the site enough times to understand the reality here rather than just looking at a plan. Again, that's difficult if you're dealing with a remote architect. How many times is the architect actually going to come down to the site? And are they going to pick that up?

Ben: What else have we not talked about? I'm not sure we completed that last bit of the house. We talked about the tiles going on and the solar panels going up but there's a lot of fixing out internally and other jobs.

Jeremy: That's the really slow bit really because all of the internal stuff, I've done myself. I did get a joiner in to hang the doors because they're very heavy but I've laid all of the flooring and done most of the decorating, curtains, fittings and cupboards. I did all of the plumbing and the heating system.

I had to get an electrician in to do the basic wiring because I don't have a Part P certificate but we worked together. So, I worked as the electrician's labourer effectively, to get that right.

It's really slowed down because it's just been one man working on his own ninety percent of the time. And you don't realise how long jobs take when you're doing things on your own.

Putting ventilation ducting in, for example, it didn't take very long but on your own, it means running from one end of the house to the other twenty times an hour as you pull a foot through and then go to the other end and push a bit through etc. With two of you, it would've been half an hour rather than three hours. It's that sort of scale of a problem.

Ben: Would you have changed that? Because how many years are we up to now?

Jeremy: Three years. The build started in October 2013.

Ben: And four before that looking for the land.

Jeremy: And four before that looking for the land and things, yes. And we've had a year of delay over the water supply.

So, in reality, instead of October 2013 to the end of September 2016 when we got the completion certificate, that would've been a year earlier had we not had a year of battling to get palatable water out of the borehole. That was, I think, an 11-month delay.

Nobody's fault really. The borehole company did give me some compensation and were very good to deal with. They admitted they'd made some errors and what had happened. I did an awful lot of work without realising the borehole company had made an error. So, I spent six months trying to fix problems and make the water supply work without realising the borehole wasn't correct.

So, there was a lot of hassle there and a lot of stress.

I think one thing I'd like to say is never underestimate the emotional strain that self-build will put on you. Even if you're the most sane, calm, pragmatic person, you will suffer some severe stress. For me, I will say I came extremely close to having what I think would be called a mental breakdown.

Ben: You don't resent the building or anything like that though?

Jeremy: No, I don't. But you just need to be aware.

And I'm not alone. The self-build forums are fantastic support groups for self-builders. Not just because of the exchange of ideas and information and learning from the experience, but I think one of the biggest benefits I found of being on internet forums of self-builders was you're not alone when you come close to having a nervous breakdown. You realise that actually practically every self-builder comes to that stage in the build where it all just gets too much.

Ben: It's a big project. We know that. Are there any other key tips that you'd give someone coming in to this?

Jeremy: Do your research.

I think the most important thing you can do is research, research and more research. Don't trust anybody until you've double-checked everything three times yourself.

There are so many people saying so many things. You just have to work through until you understand it and so that you're clear that what you're getting is actually applicable to what you want to do and is the truth from the perspective of what you're doing.

Somebody else's advice on the type of windows, the type of heating system or the type of water system to put in might be absolutely right for what they're doing. But it might be absolutely wrong for what you're doing.

There's no substitute for you gaining the knowledge and just putting the graft in and doing it. None of this stuff is rocket science. You don't require degrees in anything to understand it. If you require degrees and whatever then the building industry wouldn't be populated by the sort of people it is. You do have to understand how it all works though. And once you understand that, you know that you're buying the right stuff and not the wrong stuff.

I made lots of mistakes and bought things which I've later sold on eBay. I bought a thermal store for hot water and then we found it overheated the bedroom to such a degree with the heat loss from 210 litres of hot water. It cracked an oak door, it got that hot. We sold it to a couple in Yorkshire on eBay and it's going in an old stone cottage. I'm sure it'll do their job perfectly.

That was an example of me not doing enough research on heat losses. Because the heat loss is stipulated on thermal stores and hot water cylinders. Don't assume that they will contain the hot water all day.

It sounds daft but the European cycle test assumes that the tank is actually cold for much of the time and it's only heated for short periods during the day when it's used. And that's not the case for most people now. They heat up their hot water with solar panels and whatever. The thing will be hot for long periods of time.

So, you have to really just research and ask questions if you don't understand it. And that's where the forums are great actually. The self-build forums are fantastic for that. Except you might get six answers to one question and they might be six different answers.

Ben: That's always the way. You have to make the final decision. When are you moving in and how do you feel about that?

Jeremy: We're moving in as soon as we've got our existing house sold and we've got our VAT back. We're currently waiting for the VAT man to process our VAT reclaim. We're owed just over £10,000 of VAT.

A year ago, we ran out of money. So, that slowed things down. I've been doing things on the house when I've had a bit of spare cash from my pension. That's not what we originally planned. If we originally got the money back, we'd have sold our old house, recovered all of our savings and been well away.

I should have the VAT money back before Christmas. That's going to be used really to tart up the house we're selling, which I've already started on doing but the drive needs resurfacing. The impact when you come in is one of the big things when you're selling a house.

As soon as that's done, that's going on the market and then we can move in.

We have to be a bit cautious about selling and moving because we own two houses. At the moment, this house doesn't attract capital gains – well, it would attract capital gains tax if we were to sell it.

If we move in here and leave our old house empty, there is a technical problem in that if we then sell that, it's a second home and we could possibly find ourselves in a difficult tax position. So, it's better to stay legally living in your old house until you've got it on the market and sold and then you can come under the normal rules of selling your house and moving into the one you've built. So, that's what we're planning to do.

Ben: Jeremy, I've really enjoyed our chat. Thank you so much for doing this and all the wisdom that you've shared. Thank you.

Jeremy: It's been nice to talk to you and I hope that people can approach self-build with a little more enthusiasm ...