

Episode 126

When is it right to demolish and rebuild? – with Simon Sturgis from Sturgis Carbon Profiling

The show notes: www.houseplanninghelp.com/126

Intro: Recently in my search for a building plot I've been looking at bungalows. The intention would be to demolish the existing run-down property and build a new house from scratch. But how bad does a building need to be to start all over again? Should I be thinking of a retrofit and then increasing the floor area instead?

Sturgis Carbon Profiling do a lot of detailed work in this area and I caught up with their Managing Director, Simon Sturgis.

I started by asking Simon for a bit of background about himself and his work.

Simon: I'm an architect. I've been an architect for longer than I care to remember, but started looking at this whole issue of carbon in construction about 8/9 years ago when we'd been involved with a lot of retrofit refurbishment work in property and with developers and so on.

And every time you got involved with that it seemed like you were throwing huge amounts of material away and it seemed that there must be, quite often the material's quite new and it's being thrown away seemingly part used if you like, and what a waste this was.

And it was a question of could this be quantified. Clearly money was difficult because how do you quantify the value of second hand cladding, but it obviously has no commercial value, but it does have a carbon value we became aware of.

So we started to look into the whole idea of carbon valuing. A valuation using carbon if you like as a currency of sustainability and that's how we started looking at this.

Ben: Carbon. Why carbon and is it the be-all and end-all?

Simon: Well it was really started with I suppose looking at the fact that energy use in buildings was already being measured, so if you're talking about day to day energy use, that's what people are familiar with. So just coming up with something that was equally familiar but relating to materials, and of course if you're using energy that is clean if you like, i.e. it's made without doing something negative, then what's the problem? So the problem really revolves around the negative aspects.

So carbon as we describe it, or carbon emissions, is a short hand for greenhouse gases, of which carbon is the biggest, or carbon dioxide is the biggest. So if you like it's a slightly sloppy shorthand for looking at things.

So having identified that in the sort of operational side of things, we then said well how does that reflect? Can that be measured in an equivalent way in materials? And of course the answer is yes it can, because to make anything takes up energy, and depending on where it's made determines the sort of energy. So for example if it's made in Norway you're probably using hydroelectric which there's nothing wrong with that. If you're making it in Germany say, increasingly you're going to be using lignacite which is really bad. So it's really understanding the impacts. If you're making things in the UK you're obviously using oil and gas, so what are the impacts of those things? So it's really understanding that and trying to redirect our ability to make things away from if you like damaging carbon intensive technologies.

Ben: Every time we build a house there is an impact behind it and it's very difficult to see it. Someone like me as a layman for example, I want to build my own house and I've been to a plot where there was an old run-down bungalow. And I look at that and think do you know, I want to knock it down, to be able to get the property that I want. But I'm sure there's more that should guide my decision.

Simon: Well I think there's a couple of things. The first thing is that the material, i.e. the bungalow, is a carbon asset. It has a value and the question I suppose is, is it suitable for what you want? But it's not just a one-off decision because inherent in this whole idea of thinking is the life span, life expectancy or life cycle if you like.

So if that bungalow let's say is really poorly made and is about to fall apart well then you're probably better off removing it, disposing of it in as better way as possible, or recycling it as best as possible, but building something in its place that either fulfils if you like a

durability factor that the previous building didn't have, so that the building will last a long time.

And obviously if you're talking about Victorian or Georgian terrace houses, they've been around for a hundred, two hundred years without much problem. Yet for some reason today we tend to think of anything that lasts more than 20 years as being an achievement, which seems ridiculous.

But also the other way to look at it is whether the building you're building is capable of easy recycling and adaptability and re-use. So if for example your house is made of, your new house made of bricks, well you're probably confident that's going to last you hundreds of years potentially. If on the other hand let's say you build it out of timber, you might say well it's not going to last me as long but at least I can adapt it and change it and re-use it and move it and do sort of other things with it.

So depending on your agenda in terms of where you want to go with your property, will determine the kind of lowest carbon outcome. And it's partially to do with recyclability, it's partially to do with life span and longevity.

Ben: How can I as a layman assess that, or do I need to hire the services of someone?

Simon: It's a good question! I think it's difficult. I think in some respects, well I'll tell you there's one example. We did a report for Westminster City Council English Heritage on exactly this topic, called Low Carbon Retrofit in Soho, which gives you some clues on this and gives you simple guidance. And that was published about 2 or 3 years ago.

But I think it's probably kind of common sense. If you're building something that is not durable, is likely to fall to pieces, badly made, well you're probably putting carbon into the atmosphere which you're going to have to repeat the process relatively soon. So it's about building well, a lot of it quite simply.

Ben: And the life cycle side of this is tricky though isn't it? Because I might go into this with the intentions of this will be here for 100/150 years, and there are cases for example where people build these energy efficient houses, or I can think of one supermarket for example where they were shouting about how good it was, and then 10 years later, because of land prices they've demolished it and something else has gone up there. Probably housing!

Simon: Well this is a perennial problem. I mean in the City of London I think the average life expectancy of an office building is about 17 or 18 years. So you think of the carbon investment and then as you say, and the disposal is obviously crazy which is why I think if we could move to a model, and some people term this 'circular economy' where you build with the expectation that when you've finished with the building it can be re-used, not necessarily in the same place but it can be taken apart, the elements distributed and re-used in other buildings.

But of course that requires planning at the outset for an eventual disposal and that means changing people's mind-sets because most people when they build a building, build it, certainly if you're a property developer or a supermarket owner shall we say, you are probably building it for a 20 year use, after which it's of no interest to you what happens to it. And that's really not good enough. I think it's a question of saying can we build buildings that can be moved.

Now interestingly enough we did a project with a well known shed and office sort of developer who builds all over Thames Valley and elsewhere in the UK, and they had a building that was 10 years old. It was a two-storey shed-come-office. And we helped them take it to pieces, move it a mile to a better location and reassemble it. And that was for a building that hadn't been designed to do that. Yet because of the way it was constructed, it was steel bolted, it had aluminium cladding, we actually re-used something like 70% of the material. The cost of that process was cheaper than by about I think it was about 25% / 30% cheaper than a new building of the same size. And the carbon benefits were significant. I mean we didn't have to build a new building, we moved an old building and took it apart and tidied it up as we went.

So it can be done. It's just a question of will and intention. So I think it is changing mind-sets. It's a cultural issue as much as anything else.

Ben: Even us just talking about this, I'd realised that although I want to build a home, that has never even crossed my mind about perhaps it being taken down at some point and used again. Is this about the materials that we're using or is this out of our control really?

Simon: I think it's a combination. I think it is partially the materials but it's also what you build. I mean the office I'm in is a Victorian warehouse. It was originally designed, well it was put up, for making the metal stays in corsets in sort of 1900. And then went on

to make tape measures, and we're using it as a studio. The point being that it's a very simple, basic shape. It was robustly built. It's capable of easy change and adaptation. It doesn't need to have exotic things doing. It doesn't need to be, the fundamentals are good. It could do with performing slightly better environmentally I would accept that! But as a basic prototype it's fine.

And I think we can point to a lot of certainly Victorian buildings, and interestingly enough I think a lot of 1960s type buildings are undervalued. I mean 1960s buildings typically are very simple, concrete frames which are actually very adaptable and capable of all sorts of use. But of course they tend not to have the biggest possible footprint and people want to build a bigger floor plate. But as a sort of generic type, they are flexible. And funnily enough they're probably in some ways more flexible than say 1970s buildings.

So you know it's a question of understanding how things, as much as the material is used as how they're actually laid out and conceived.

Ben: Can we talk a little bit about the demolition process, and I can think of a couple of factors: there's transport, there's putting it into landfill, you've talked about recycling. Are there any other factors that we need to get in our mind that this is what's happening when we demolish something?

Simon: Well I would like to get to a model where demolition is followed by re-use, rather than demolition is followed by disposal. And that comes back to the circular economy notion again. That when you demolish, demolish kind of sounds destructive. You have sort of visions of big metal balls smashing things to pieces. I think demolition would be far better if it was more of an incremental thing.

And I think there's interesting social issues here too, because for example there is the Social Value Act which the government passed, which enables you to put a value to social benefit through what you do with property.

If I can give you an example, so at the moment if you take apart, let's say a Victorian house and you pile up all the bricks, first of all you've got to clean them. So that's an expensive process. It's actually cheaper to buy new bricks than it is to buy recycled bricks. So of course you buy new bricks. But if the process of cleaning those bricks was paid for through social value, in other words it was done by people that would otherwise be say in prison or whatever, in other words they are part of a sort of social healing process, and

that saves money to the developer, in other words they can now buy recycled bricks for the same money as a new brick, then a) you're contributing to social issues, but also you are helping the demolition process become a positive rather than a negative. It's turning it into things that can be re-used.

So I think again there's a sort of re-modelling but equally it's a question of making the right choices at the beginning. So with bricks, if you use cement mortar which is very rigid, you can't take that off a brick with ease. So when you come to demolishing the building you simply won't be able to re-use those bricks. If you use a lime mortar which of course was what they used frequently when they were originally built, the lime mortar comes off relatively easily. So yes the brick can be re-used.

So I think that it comes back to the point that you've got to think about this from the outset. That if you wish to re-use things you've got to decide how you're going to put them together in the first place. I've used a brick but there's no reason why it can't be done with steel, aluminium, glass, plastics. The same conceptual approach can apply to all sorts of things.

Ben: And is the incentive wrong? Just moving this on, you mention a couple of factors there about trying to encourage more recycling, but for tax as well, VAT on a new build is going to cost zero versus a retrofit which is going to come out at 20%.

Simon: Yeah, I think that's obviously a big issue. I think it's always going to be, unless we've got a change. But I think that being said we are finding that a lot of clients that we work with who own large, if you like existing portfolios of property, they find a way to do it. And they find a way to do it to make money so it can't be that difficult.

I think it's true that if your location has a premium value it's going to be easier than if you've got a house in the middle of nowhere. But all these things, it can be done but obviously it's not going to be as profitable. But if that's not your primary driving motive but it's a motive then you can achieve these things I believe.

Ben: When it comes to demolition, are there any regulations that say you can't demolish a building?

Simon: Well the first one that jumps to mind is listed building consent. So if a building is listed, or for that matter in a conservation area, you can't just knock them down. You have to get approval for the replacement as much as anything else. So that's one.

I suppose in certain areas there's going to be health and safety issues I guess about dropping buildings next to sort of sensitive sites or over if you're next to railways and things.

I suppose the only other point would be that you can't just demolish a building if you're next door to somebody else. You have to do party wall type stuff, so you have to get surveyors involved. So if you're planning to demolish a building you need to check all of those things out: planning, adjoining owners and so on.

Ben: You go into a lot of detail with many of the things that you do, and I'd like you to talk through one piece of research that you brought to my attention. Do you want to start explaining it?

Simon: We do articles for Building magazine every 6 months on carbon economics and we did one a few years ago now which was looking at three different scenarios.

The first scenario was maintaining an existing Victorian terraced house, and what the carbon cost of that was. And of course when you draw a graph of it the carbon cost is principally heating and basically that kind of energy use. So it's what you might describe as regulated energy use. In other words covered by building regulations.

The second scenario was looking at what you did if you took that Victorian house and you upgraded it. And you upgraded it to a high standard, and I think it's what's known as 'fabric first'. But what it basically boils down to is lots of insulation, making sure it's appropriately airtight but has the right ventilation and so on. And of course to do that takes a certain amount of material going into the building, i.e. insulation and the like. But what it does do is it makes a huge difference to the performance and the requirement for heating.

The third scenario we looked at was a brand new Passivhaus. What a Passivhaus is, is it's based on a German idea but the idea is that the building performs to such a high standard that you need virtually no heating during the winter months because it's very well insulated, it's got triple glazing, it's got no leaks in the building, it's airtight to a phenomenal level and so on.

And what we discovered was that, and it was a fairly small sample but we what we discovered in our analysis was that it was actually in over all environmental terms, in other words, looking at both the

carbon emissions from the materials combined with the carbon emissions from day-to-day use, that it was better to retrofit to a high standard an existing terraced house than it was to build a new terraced house. And the reason being, that to build that building consumes a lot of energy. You've got to produce all the bricks, you've got to produce all the materials that go into it, whereas retrofitting is obviously you have to use a certain amount of material but the building is fundamentally there.

And our analysis I think was over a 60 year period but it doesn't really change if you go to 80 or even 100 years because you're replenishing the building. You're putting more maintenance and so on into it. So it's not necessarily the case to say you should demolish Victorian buildings if you want to get a highly efficient carbon outcome. You need to make them work better.

Ben: And is it largely because of the example that you have selected? Would that work with different types of buildings? You talked about the 1970s, if you've got some of those buildings, or are you starting to go into a trickier trade off that you're not quite sure what's there? It might be tougher to bring up to EnerPHit standard?

Simon: One of the issues is things like how much glass there is. If you've got a highly glazed, say office type building, then you've got a problem anyway because highly glazed buildings if you've got double glazed units, double glazed units only last about 40 or so years, after which they have to be replaced. And that typically means taking the whole façade to pieces if you've got a fully glazed building.

If you've got a sort of traditional house type model where you've got individual windows and of course they can be replaced as they fail, so there's an interesting range of issues coming out of that. But I think the answer is probably that it's a combination again of durability against ability to adapt and change.

Ben: And in terms of constraints, we know that a lot of buildings do get demolished. The constraints of a retrofit must be deterring people, or are there other factors?

Simon: Well the first point is I suppose, I never quite remember the numbers but something like 80% of all buildings that we build by 2050 are already built. So that's probably an erroneous number but the quantum kind of gives you an idea that most buildings already built that are going to be here over the next 40, 50, 80 years, so it is all about retrofit. Retrofit is obviously the biggest thing.

I think on the other hand people have a sort of, people like things to be shiny and new and for certain things that's essential. For certain things if you've got a new type of thing you're going to do then you need maybe a new interior to do it.

But I think that certainly in areas where you've got quality buildings that are capable of retrofitting I think people are seeing the opportunities afforded by retrofit in terms of interest, in terms of enjoyability, architectural quality, life and health and wellbeing and so on. I think people kind of enjoy it.

As an architect I've designed brand new buildings with crinkly glass façades and things so I'm not anti new buildings at all, but as a principle we've got to think about different ways of doing them.

Ben: And it's also as a self builder and trying to make this work, close to London it's tough to find that land. It is a lot easier to find pre-existing buildings.

Simon: Yes. Yes, I think that's absolutely correct, and I think in a sense we're doing society a good service by re-using things rather than flattening them.

Ben: Well Simon, I've really enjoyed our chat today. Thank you very much for all your information. I appreciate it.

Simon: Great, thanks a lot.