HOUSE OF LORDS

Select Committee on Science and Technology

Corrected oral evidence: Off-site manufacture for construction

Tuesday 15 May 2018

3.30 pm

Watch the meeting

Members present: Lord Patel (Chairman); Lord Borwick; Lord Griffiths of Fforestfach; Lord Hunt of Chesterton; Lord Kakkar; Lord Mair; Lord Renfrew of Kaimsthorn; Lord Vallance of Tummel; Baroness Young of Old Scone.

Evidence Session No. 7 Heard in Public Questions 50 - 56

Witnesses

Suzannah Nichol MBE, Chief Executive, Build UK; Simon Rawlinson, Construction Industry Council; Dr Diana Montgomery, Chief Executive, Construction Products Association.

USE OF THE TRANSCRIPT

This is a corrected transcript of evidence taken in public and webcast on www.parliamentlive.tv.

Examination of witnesses

Suzannah Nichol MBE, Simon Rawlinson and Dr Diana Montgomery.

Q50 **The Chairman:** Good afternoon and thank you very much for coming to help us with this inquiry. We appreciate it very much. For the record, would you like to say who you and who you represent and, if you want to make an opening statement or say a few words, please feel free to do so? This will be broadcast on the parliamentary website.

Simon Rawlinson: I am a partner with the consulting business Arcadis, and this afternoon I am representing the Construction Industry Council. The Construction Industry Council represents professional bodies, research bodies and specialist business bodies, encompassing 25,000 advisory firms and 50,000 professionals operating in the construction industry.

As part of the Construction Leadership Council, in introducing my platform of off-site manufacture, I would highlight that the CLC has described off-site manufacture as "smart" construction. We do that because we want to emphasise that there are process elements associated with off-site manufacture, particularly in collaboration, which I will return to when we talk about business models. It is the combination of digital capabilities in the design, the control of manufacture and the manufacture itself. Of course, we do this to deliver certain outcomes, most of which are about increasing capacity and additional capacity in delivering, for example, homes and infrastructure.

Suzannah Nichol: I am the chief executive of an organisation called Build UK. The core of our membership is the contracting supply chain and we bring together 27 of the largest contractors in construction, some of which have given evidence over the last few weeks. Our membership includes 40 trade bodies, which represent over 11,000 specialist contractors, which make up that contracting supply chain and about 40% of the construction sector. They are the ones who physically deliver construction out on-site. They may also take a role in designing that and in maintaining it afterwards.

We also have a membership of client organisations; 15 of the biggest developers who procure or buy from that construction supply chain, and professional services that advise either those clients or those contractors.

We are in a reasonably unique position to have a broad overview from the delivery side of construction—traditional through to pure off-site and on the manufacturing side at multiple levels. Alongside the CPA and the CIC, we can see the whole picture and ideally piece some of that together as we have no particular vested interest in off-site manufacturing.

Hopefully, we can add to your information today rather than perhaps repeat what you have heard over the last few weeks.

Dr Diana Montgomery: I run the Construction Products Association. We represent the manufacturers and distributors of construction products, which is everything from materials that are mined from the ground through to the products used to build buildings, through to the distributors and the builders' merchants that manage the logistics. We represent about 87% of that sector by value, so we very much speak for the whole sector.

In the same way as Build UK, we have a number of trade associations in our membership—at the last count it was about 35—which means that we have 330,000 people within the umbrella of the organisation and about 23,000 companies. Many of them are very large names that you will have heard of and there are an awful lot of SMEs. Their turnover is about £56 billion. From an off-site manufacturing point of view, we are manufacturers at heart, so we count as manufacturing. Our productivity is aligned to the manufacturing norms rather than construction.

In conversations such as this, we work very closely with the likes of the MTC and others looking at manufacturing processes—Lean, Six Sigma and those sorts of things—and we try to feed that into the rest of the construction supply chain. As Simon has alluded to, I sit on the steering group for the work the CLC does in smarter construction and innovation in buildings, looking at how we get this all moving forward faster.

Q51 **The Chairman:** Thank you very much indeed. I will kick off the questions.

We have had a lot of both written and oral evidence that says that we need a wider uptake of off-site construction. Everybody seems to be signed up to the idea of greater off-site construction, so the question is: why is it not happening? What are the blocks against it happening? How would a wider uptake affect the industries that you represent?

Dr Diana Montgomery: There is already quite a lot happening. It very much depends on the view you take of off-site manufacturing. We take a very broad view that it is not one particular thing. It is not just pods being craned on or complete units. It can be anything from some really good stuff, such as precast panels going into roads and bridges that improve quality, productivity and so on, through to drainage systems on motorways, through to examples that you have seen in the residential sector of complete door systems, fire doors and so on. A lot is happening where the commercial case is clear. Often that is where it is incredibly bespoke or incredibly wide-ranging, and it can go towards lots of different solutions.

As you might have heard in the evidence, it is a manufacturing sector that supplies a very cyclical industry, and I have never worked in a sector like it. You have heard all the data about how housing fell 70% in the last recession. It is incredibly problematic for a manufacturing operation to supply into that. Any manufacturing requires capital investment to get your plant off the ground and it needs a sensible payback. If you are looking at a pipeline that looks less than six months out—the national infrastructure plan is the exception—and at short-term deliverables without that longer-term vision, it is really problematic to write a business case and get investment.

We might talk about it later. We are trying to move to a slightly more long-term view for construction, and the national infrastructure plan is certainly helping that, and starting to look at a different business model for construction where other sectors partner with their supply chain. That partnership will be really important if we want to see strides in people investing to improve productivity, safety, quality and so on.

Suzannah Nichol: I would support Diana in that there is quite a lot going on. I learned a new word—componentisation—which is where elements are delivered and manufactured rather than whole units. There is a whole blend of what is called off-site manufacturing or pre-manufactured value. Last week I was out on site at Wembley Park and they are doing loads of it. The balconies, for example, were delivered as a unit and just slotted on. The bathroom was delivered as a pod and just fitted in. That is off-site manufacturing.

I had the opportunity to talk with the contractor's site manager, who said he would love to do more of it. He was very clear about what his next fit would be, but he needed to go back to the design stage for the next one and say, "You need to do this differently". He would like to bolt the service cupboards together. He could not on this project, but he would be able to do so on the next one.

Where something is assembled probably determines whether it is off-site or not in a manufacturing environment. Various elements can be manufactured off-site somewhere and brought in or a whole unit can be brought in. It is the whole blend.

We also have to bear in mind that a substantial amount of construction work is repair and maintenance. You are about to undergo quite a substantial refurbishment here and you will see that up close and personal over the next few years. People have to think about a completely different process. They are probably not even looking at off-site manufacture, because they see themselves going in to repair and maintain. There is a huge potential. It is not directly applicable to craning things in, but there will be more componentisation.

The question is: why is it not happening at scale and faster? There are two overarching answers. As Diana has mentioned, it has to be commercially viable; no business is going to do something if the business case cannot be made for it. Secondly, the risks are still unknown, not understood, or considered to be too great to take that leap of faith from what you know to what you do not. It is quite a big step for a business doing a big project. If you get it wrong, you are a bit too deep in and have already made some fundamental decisions.

There are different issues at different levels. You will have heard a lot of them and I will pick up on a few. The clients would have to change fundamentally the way they invest. Their investment decisions involve one supplier or a smaller number of suppliers, which is quite a risk if the market is not mature, and if you invest in one particular area and there is a problem. If you go via the traditional route, you will have lots of other options. Thus there is the risk element.

There is no real incentive for many people. It is not necessarily cheaper. They do not know what the right answer is. There are very few industry standards; you will have heard from Mark Farmer about that. If you buy a kettle, it has a plug that fits into any house. Construction does not quite work like that; there are lots of different ways of installing things, so it is really difficult. There is no right or a wrong answer and there is almost too much choice. It is not standardisation but consistency that we are looking for. For instance, when you go to buy a car, you know in this country that you will drive on the left-hand side of the road, so you buy your car as a right-hand drive. It is quite simple and you do not have to make a choice about that.

The other issue is behaviour. The industry is large. They do not trust each other and do not have those deep relationships with their supply chain. We have to deal with that and build longer-term relationships and a more mature market, so that when you are making decisions you have confidence that the market can deliver all the way through to the end. I will hand over to Simon.

Simon Rawlinson: To enable you to get through the agenda, I will make an observation about the supply chain and in particular about the off-site modular aspect of the industry. In that industry, there are probably no more than six or seven large-scale suppliers in the UK, so from a scale perspective those business have quite a nice business model without exposing themselves to a great amount of investment risk. They are quite profitable, so the incentive for the supply side to expand at the rate, which UK plc is in effect asking them to do, is not there.

Very few of those players have access to substantial institutional funding to be able to go to that next stage of expansion. Organisations have operated at that level for the last 15 or 20 years, so they are comfortable. They are busy enough to be profitable and are asking, "Do we need to expand to maintain our position?"

On the other side, as has been clearly identified, there are no real signals coming out of the marketplace that there is a big prize for them to go for. There is rhetoric about the prize, but it is not necessarily there in front of them. The relationship between the desire to invest and the clarity of the prize needs to be clear to break that cycle.

The Chairman: Thank you very much. We might come back to some of the answers you gave, but let me go to Lord Renfrew first.

Q52 **Lord Renfrew of Kaimsthorn:** Last week we heard from David Hurcomb of the NG Bailey group, who rather depressed me by saying that it will be outsiders, probably from the Far East and China, who will take things forward in this country.

Do you think business models in the construction industry here need to change in order for off-site manufacture to become more widely used? If so, how do you think they need to change? How can that change be brought about?

Simon Rawlinson: NG Bailey is a specialist contractor, and its position in the way projects are procured and delivered illustrates some of the flaws in the business model that we operate in construction. Typically, an organisation such as NG Bailey, which does most of the detailed design work, and indeed introduces a lot of the off-site manufacture capability—the service cupboards that Suzannah described—is not appointed until the project has been let and the financial programme parameters have been set. There are lots of good reasons for that. Clients quite like to use best-of-breed suppliers, for example—their favourite designers, engineers and contractors. Also, of course, the construction industry relies on competition to demonstrate value. The idea that we are fragmenting the supply chain and the delivery of solutions gets to the heart of the problem.

Three things might change that model. The first is the need to achieve scale—the scale of people asking for the same thing. If NG Bailey is fabricating service cupboards, it wants to be doing it for multiple clients rather than one or two. It has to have access to a wide range of clients hopefully delivering standard projects. The CLC has been developing a concept called a clearing house, where you try to bring demand from multiple clients—that might be Crossrail 2 tunnel segments or Thames Tideway tunnel segments—and bringing those together so that investors have the opportunity to see where they need to build capacity.

The second thing is standardisation, so NG Bailey does not compete with other organisations such as TClarke to deliver different cupboards but they compete on value and on availability.

The final thing is the collaboration model. How do you get clients, designers, contractors and specialists to work together from the start to deliver the best outcome, but one which is demonstrated to deliver value on cost, time and all sorts of elements of performance?

Suzannah Nichol: The simple answer to that question is the current way we buy and deliver construction is not sustainable and the business models are not fit for purpose. We have lots of industry reports—if you piled them up, they would be taller than me—that tell us that is the case and give us lots of good and very consistent ways of doing what we need to do. However, everybody holding hands and jumping together has not quite happened yet, and they certainly do not drive or incentivise more manufacturing, more pre-manufacture value or more off-site.

The reason is quite simple: it not easy to change that wholescale, but ultimately that is what needs to happen. In off-site manufacturing there is a bit of a vicious circle. We need change to drive more manufacturing, but we also need more of the wins from manufacturing—better quality, improved health and safety, better programming—to come out to drive the change. The question is where we break that circle.

Simon has alluded to some of the changes needed, so I will not repeat them, but one is early engagement of the supply chain, and you will have heard that from others. The knowledge is often in the specialist supply chain. It often has a really good solution or answer, but it needs to be brought in early because it impacts on everything else. If it is not, you do not get that prize. You build what you are asked to rather than offer something that could deliver the desired outcome. If your solution is not required, you do not have anywhere else to take it, so you revert back to delivering what your purchaser, client or contractor wants. It stops the innovation, so the business model does not drive that.

You will have seen all the debates about payment, the way the industry values itself and how cash flows do not work for manufacturing. High up-front investment is required in capital and in delivering that product. If you are not paid until that is on site, somebody has to fund that. At the moment the construction commercial model does not fund that, so that is a barrier too.

That is probably enough from me, so I will hand over to you, Diana.

Dr Diana Montgomery: One piece is that, because of the model, it is very hard to plan. The supply chain is really bad at planning. With manufacturing we like to set our business plan for the year ahead. We like to know how many panels, bricks or whatever we are going to make. Our supply chain will tell us that they want stuff on the pallet tomorrow for wherever. The ability to long-term plan comes back to collaboration and partnership. Something that other sectors do that construction does not do very well is to form that long-term relationship, so that you can share the pipeline of your own investments with your supply chain.

The other piece that is really unhelpful is if that starts, as the comments about NG Bailey indicate, you absolutely have to involve manufacturing early on to understand what the opportunities and products are. What is very disruptive is when it is value-engineered out. A manufacturer may have spent a lot of time and investment developing a product, or just upscaling it for a particular project, only to find that it has been value-engineered and a copy has been brought in from somewhere else. There is a real partnership piece that will make the difference.

The Chairman: Your answers, which are very good, are exciting people to ask more questions. Can I suggest that the answers and the questions are kept brief?

Lord Vallance of Tummel: We find it difficult to ask brief questions generally, but we will do the best we can. I still do not quite understand this market. Dr Montgomery, you said that there are things happening at two extremes. One is at the bespoke big end in one-off projects and the other is at the repetitive end, which is largely a matter of capacity. In housing, you have a few big players and an absolute multiplicity of small players. The big players like the status quo, because they make money out it and there is no need to move from it.

I am looking for where the disruption comes from. Does it come from the SMEs? If so, how it is done? Is there some kind of intermediate organisation of scale that does large integrated manufacturing stuff but can also provide architecture, design and engineering? Is there a service company that could service a whole host of SMEs? Is that the sort of thing that might break it?

Dr Diana Montgomery: It is a tricky one for housing. For off-site manufacture, it would be additional to the volumes that we have at the moment in traditional build. A lot of our manufacturer members tend to invest in components and creating systems.

I am not sure whether you will get one integrator. You have heard evidence from some of those who are starting to do it. The private rental sector clearly has a longer-term objective. When we start to measure the whole-life value of a project, we start to get the ability to invest in more than just the initial building. I think Simon is dying to say something.

Simon Rawlinson: An example of a disrupter that you might be interested in is Coterra in the United States, which you might have come across. It was recently funded with $850 million from SoftBank, which is the large disruptive tech investor. Its model is interesting, because it can disrupt a housebuilding industry that is much simpler than the one we have in the UK, which is based on on-site assembly of timber components. It has brought in an entire manufacturing process to deliver that end to end.

The question is whether there are clients in the UK who might be able to create the volume in the right form—in other words, volume that is consistent and needs to be delivered quickly—to justify that level of up-front investment. I observe that there are probably large programmes, such as HS2, which might encourage people to invest in certain capacity involving repeat components such as trackbed, and there are large housing clients, such as some of the large RSLs, which are now moving to the scale of national housebuilders, which again might be interested in pooling that kind of demand.

Suzannah Nichol: To finish off, it comes down to commercial viability, and you are right: why you would change? I have three very quick examples. One of our members delivers a complete house to site. For a traditional housing project, one of our other contractors has set up a unit. Some of the houses will be traditionally built, as you can visualise. For others they will prepare a plot and put in the services. The ground floor and first floor of the house arrive on the back of a lorry and the house is plug and play. You literally plug it in. Looking at the houses alongside each other, you would not be able to tell the difference from the outside. They are on sale now and the contractor estimates delivering about 2,000 units over the next year. There is a clear example of where that is being done. They are manufactured up in the north, so the contractor is providing jobs up there. The house literally goes through a process and comes out the other end. That is available now.

Other big housing suppliers are now investing in off-site facilities themselves. A large private housebuilder is doing that now. I think you will see more of that. There is the example that I talked about out on-site at Wembley. Those units are all PRS accommodation units, so an element of manufacture is going in there rather than the complete unit. There are pockets of it happening. It is how we make that more commercially viable and accelerate that so that it is delivered at the scale that Simon talked about.

Q53 **Lord Hunt of Chesterton:** Simon Rawlinson, you work in a company with a lot of activities worldwide. Could you comment on the differences or benefits, comparing what the UK does and other countries? We heard in previous sessions that there seem to be ways of moving ahead faster on the continent than there are here.

Simon Rawlinson: I have done a specific study that has compared Japan and Germany. The first thing to say is that the overall value of the off-site manufacturing elements in the housing sectors in Japan and Germany is not necessarily that much larger. What is different is the percentage of manufactured value in those projects, particularly in Japan. Japan has this rather strange market where the land has all the value and the house is seen as a product that has a defined life cycle of no more than 25 years, so a house is more like a car and, indeed, is delivered by the kinds of corporations that we would be familiar with as being car manufacturers in the UK. That does not mean that they have the capacity of Toyota, for example, to deliver millions of cars, but they have the capacity to deliver an end-to-end integrated product that meets that market need because that is what people want.

In Germany, the market is completely different. It is a very regional market that works in a similar way to the way off-site manufacture works in the UK. Therefore, people do not have to invest a huge amount of capital, because they are only serving a market with a radius of 200 or 300 miles. However, they know that they have lots of customers, because a lot of it is self-build; people are buying a kit product that they are comfortable with. That is culturally embedded in the way Europe buys its houses.

We do not have that relationship between the house purchaser and what you might describe as the delivery organisation that designs and fabricates. We have intermediaries called housebuilders, and their preference is for delivering things in a different way. That is how we have got to the situation that we find ourselves in, which, as Diana rightly says, is looking at off-site to deliver additionality rather than necessarily the mainstream delivery of offices or houses, for example.

Lord Griffiths of Fforestfach: May I play devil's advocate? From what I have heard, the business model and market structure of the construction industry, which is very divided and full of small-scale operations and so on, is also an industry that was hammered by the financial crisis, so there is a lack of capital in it. If you want a company to be an integrator, the essential condition is that it must have capital. The City of London was once divided into small, almost family businesses that have grown up as stockbrokers—Jarvis and so on. What happened was that foreign banks—American, Japanese, Swiss, continental European—came in in a major way. They brought capital and the whole structure changed.

I cannot see how in the UK, going back to Lord Renfrew's point, there is an integrator—short of the Government, and I do not think we are looking for that as the integrator—that could do it. As Lord Renfrew has already mentioned, that means that we are looking at China or some Far East company.

My question at the end is: can we ever have a restructuring of the construction industry in Britain without a major transfer of capital from east to west? I cannot see how we can do it by ourselves, because there is no evidence, frankly, that you can show me. If I may say so, all the evidence you are talking about is a little thing in Watford and a little thing somewhere else, which is wonderful, but in the end there is no vision for transforming the industry here.

Simon Rawlinson: A vision for transforming the entire industry is very difficult by reason of the fragmentation that you mention, but there are segments and sectors of the industry that are building quite clear visions of how they might do that. While I do not want to use this as the on-site reference, you should be aware of the transforming infrastructure performance strategy and the transport infrastructure efficiency strategy, which both focus on creating volume in demand to unlock the investment you describe.

We know that the UK is very good at attracting and applying capital investment, and it generally does that again by responding to pooled demand. I would not be surprised if we found ourselves at some point with decent scaled manufacturing capability aligned to the construction industry, but it needs to have a demand signal to encourage that investment through. One example of that, and I cannot name the RSL that prompted it, has signed a 5,000-unit deal with a Chinese off-site manufacturing provider to deliver those over, I think, five years, which is equivalent to a $5 billion investment in cash terms, so it can be done. The only way is if we start to pool demand, and that will start to unleash the opportunity to invest.

Suzannah Nichol: I always find the devil’s advocate questions the most interesting and exciting, so thank you very much. It is amazing that, despite the industry, we have we deliver some fantastic projects. You only have to look out of the window here. I cycled here and came past the Thames Tideway project. We deliver fantastic stuff despite the system, I often say, rather than because of it.

One of our challenges is that the disrupter has not happened in a way that has dramatically changed how the industry performs, behaves and builds. There are 230,000 different companies. About 90% of them have fewer than 10 employees, so the industry is built on SMEs. It wants to transform itself, and everybody would like that, but the client base is very individual.

You could say that about other sectors. We go in individually to buy our weekly shop, yet that sector seems to have delivered a different offering. Do not forget that the public sector is 40% of our client base. While there are individual clients within that 40%, you have that opportunity to make some fundamental decisions as the public sector to buy at scale, and to have some consistency of demand, design and delivery.

You could have a major impact on our schools or prisons programmes, or on a lot of homes, by pooling that demand and being really clear about the ask; otherwise the industry will continue to deliver amazing projects, and we will have to nudge it, pull it and drive it to be better, because there is a prize for everybody, but there is also a cost.

Q54 **Lord Kakkar:** To build on that, we wanted to explore how companies in this sector might be encouraged to collaborate more. If I have understood your answers so far, which have covered much of this ground, companies have to be pushed into collaboration, and that may be through government action and procurement. Are there other measures? For instance, could there be measures with regard to favourable tax treatment? Would that be acceptable in this industry? Would it put huge pressure on the already established broad range of small and medium-sized enterprises and undermine their ability to deliver? How should the industry itself encourage coming together and collaborating on this?

Dr Diana Montgomery: It is about procurement first and foremost. Government is an enormous procurer. Infrastructure is starting to get there. Simon mentioned the TIP programme. The Infrastructure Client Group, which is where the major infrastructure clients work collaboratively to understand best practice, has produced Project 13, which was launched last week or the week before. That starts to explore the procurement model and how that is best done, and it will start to give scale and programming.

The other thing that is very difficult for the UK manufacturing market is the fact that 80% of the products that we use here are made here. We do not import a lot, and we cannot as they are heavy and full of air, but the last thing we can afford to do is have a national infrastructure plan to try to procure all their projects within a 12-month period, because we physically could not deliver it. We do not have the plant, the people or the capacity to do so. Procurement is enormous. The Government have a balanced scorecard. If they used it, it would allow us to have a better view of real value when it comes to cost, quality and environmental impact. There is a piece about using the balanced scorecard that they have committed to.

There is a leadership challenge for the sector. You will hear from Andy Wolstenholme in a bit. There is an opportunity for the Construction Leadership Council to step up and take on that leadership piece. Certainly the chief executives around the board tables of my member companies need to feel that now is the time they can step up.

Construction is also driven by regulation. We need to be very clear and consistent. Policy changes are unhelpful. We could mention the zero carbon homes target, which changes quite frequently, and we might be about to see another one. We can innovate and deliver quality products, but you need to give us a long-term objective so that we can work to that. A consistent policy and a regulatory framework are really helpful.

Lord Kakkar: Does that include planning? Can the planning system change to force this type of approach?

Dr Diana Montgomery: From my point of view, planning is not the issue that we are talking about today. There is a whole host of other issues to do with planning, but that is not stopping collaborative partnership in delivering the building and running the building. That, I think, is the piece.

Suzannah Nichol: Planning has a role to play as one of the levers. In answer to the very specific question, we have a big role to play here. Industry bodies have often worked in one direction for their members, and we need to show some real leadership and say, "Stop talking about this. If we really want the revolution to happen, if you want a better industry and this is the prize, this is the direction we need to go in".

Lord Kakkar: How will that happen?

Suzannah Nichol: It is starting to happen. There is the fact that the three of us are sitting here and know what we are good at and we work between us. The construction sector deal is a real demonstration of the whole industry coming together. You will start to see our business plans aligned behind that sector deal and delivering the outcomes in that. We have the industrial strategy challenge fund, and we will certainly say to all our members, "Stop doing R&D on tiny scales individually. This is where the action is. If we are going to do some R&D, we do it together and we benefit collectively and collaboratively from the outcomes".

It is about us showing leadership. It is no longer about nice things to do and guidance and information. It is about saying, "If you want a transformed industry, if you want a business in the future, this is where we are heading", and enough of them following. The industry is really good at responding in a crisis. We have seen that over the last 12 months. There is a catalyst for change and it has the opportunity. It needs that direction and leadership.

Simon Rawlinson: I would make a very quick observation about the unintended consequences of things we do with the best of intentions. One example is frameworks. We establish frameworks, and quite often that constrains the kinds of answers the industry gives to you. If you have a framework that encourages people to design things before they buy and manufacture them, you get answers that are based on people first designing and then bidding. Designing frameworks to bring off-site manufacture to the front of the thinking and the front of the procurement would be a positive act which clients and their advisers—lawyers, and cost consultants such as my organisation—can do to move things forward.

Lord Mair: In a sense, I am jumping to the last question, but it is very relevant.

The Chairman: Take your question now.

Q55 **Lord Mair:** What you said about collaboration, new models and new ways of doing things makes perfect sense, but the real challenge is how you persuade clients—not necessarily government but probably government, too—who are thinking about a new piece of infrastructure to take on board everything you have been saying? We can say all these things about the importance of collaboration, and the excellent work done by the CLC is pointing the way forward, but if you are a client setting out with a new piece of infrastructure in mind, how are you persuaded?

Simon Rawlinson: Can I use an example of work that we are doing as an organisation? We are a consulting organisation and we have teamed up with one or two specialist off-site manufacturers. Before you get into a procurement activity, you try to demonstrate that it can be done and that the solution relates directly to that client's particular needs. You give people the confidence so that they see the solution right from the start, they see that it meets their needs and they start to understand the kinds of constraints and decisions that they need to make.

A problem that the industry has at times is that it is a little like a Russian doll; you take one stage and the next stage and the next stage, and you never get the answer right from the start. Helping clients to understand the full implications and see what it looks like at an early stage makes a great difference.

Suzannah Nichol: To reinforce that—and I will never forget Sir Michael Latham who said, "Everyone must have prizes"—this has to be a win for the client. We need to be better and clearer about what the win is and what it is not if you do not go down that route. You get to the point of saying, "Why wouldn't you do it this way?" If you want to know where to go somewhere in a London street, you do not get your *A to Z* out, you get your phone out. We have to move from where we are with the *A to Z* to getting your maps out on your phone, and the client seeing that as automatic: "Why wouldn't I do it that way? Why am I still doing it this way?"

Lord Mair: Are you saying that it is only the uninformed clients who are not adopting off-site manufacture?

Suzannah Nichol: No. We have not quite ticked the risky bit. I was with a very educated client last week who was talking about explaining the risk to his investors, because the client is only one part in the chain. He was going from something he knows and that he understands may have problems, although they are problems that he knows, to a leap to here. There is not enough of a win at the moment. Nobody has quite felt that win enough to say, "Oh, you are still doing it the old way". That is the bit we keep talking about, but we are not able to nudge enough people into saying, "Why wouldn't you do it this way?"

Coming back to the homes that I talked about that are delivered on site, you need a few people to say, "I waited 10 weeks for my home and it's fantastic". Why would you go down the traditional route and wait for three, four or five months for a home which then has lots of problems with it when you could have one in 10 weeks? You could get married, order your house, go on honeymoon, come back and your house is waiting for you. What is not to like about that?

Lord Mair: I come back to the point about housing, which is fully understood. How do you think infrastructure differs from buildings, and from housing in particular?

Dr Diana Montgomery: It does, but in some ways infrastructure is the more developed. A lot of infrastructure is already done off-site, and with projects such as HS2 and the Thames Tideway we have certainly seen that the opportunities to manufacture off-site and bring it on-site hugely minimise the impact on the local communities and on the project as a whole.

Infrastructure is leading in off-site manufacturing. It is perhaps not the image that is seen of it, but a lot of it is done. One of the pieces that we have been working on through the work of the CLC group on this is making sure that we have shared metrics so that we all understand that we are talking about the same things when it comes to productivity, safety and quality. It is about making sure that all the projects share that information, so if you are a client starting to think of a project and you start to see that, why would you not go there and understand those metrics?

Infrastructure is the star at the moment, but having said that it is about sharing common metrics and the old adage that what gets measured gets done. It is about measuring and finding common languages in order to understand the success of a project, not just at the point of construction but, most importantly for me, through the life cycle of the project. At the moment, we are not very good at measuring the whole life cycle.

Q56 **Lord Hunt of Chesterton:** What types of skills are needed to facilitate a move to off-site manufacture? How do those differ from traditional construction skills? What is the difference between what we are doing in the UK and what they are doing on the continent in particular? You have given us a little about what happens in Germany. How is the training different between here and on the continent? Can we learn something more?

Simon Rawlinson: I will not be able to answer specifically the question about the professional training process on the continent, but I will make two observations. The first is about the role of the professions in the UK and, to some extent, clients. There is a really important role in upskilling the gatekeepers, the people who have the first contact with the client, whether that is a lawyer or a consultant, who shapes their thinking at the early stages, even if that is just to keep the option open, the thinking alive, so when that client meets an inspirational contractor, for example, they are receptive to somebody coming up with an innovative idea that says, "We could do it this way". The industry too often closes options down because people like to lead with their own solutions. We tend to be solution-driven organisations rather than an outcome-driven industry. That would be my particular ask on skills.

If I were to reflect on another difference between the UK and continental Europe, and reflecting on many of the organisations that deliver particularly large-scale infrastructure, the Vincis and Hochtiefs of this world, typically they own and operate these assets, so it is in their interests to be able to maximise value throughout the entire life cycle. That gives them a very different perspective on how they specify and design these things.

Lord Hunt of Chesterton: Do the UK Government impress upon people that they should look to see what is happening elsewhere?

Simon Rawlinson: The IPA did a great piece of work in 2010 that looked at a whole lot of expertise from around the world in relation to how we could improve value in the delivery of infrastructure. A lot of those lessons were learned. We need to reflect on the fact that there are certain constraints on the way that we operate infrastructure. We do not run highways on tolls, for example, so we do not have the same ownership interest that Vinci might have in France. There is quite a lot of openness and interchange between what is done in Europe and the UK simply on the basis of co-ownership of many of the contracting and engineering and consulting organisations that operate in this market.

Lord Vallance of Tummel: There seems to be a lack of marketing and sales. If you are going to get clients to buy into this, you need good marketing and good sales. There is a good sales pitch there if you can put it across. Where would the marketing and sales be located in the supply chain? Would they be the ones that get the benefit from it?

Dr Diana Montgomery: It is a really interesting question. I guess I would think: are we trying to sell off-site manufacturing or are we just trying to sell improvements in productivity? This goes back to the CLC saying that we need smarter construction. It is not just about off-site; it is also about doing stuff on-site better—using robotics, GPS and drones.

It is the whole gamut, and certainly it is about digitising the sector. We must be one of the last sectors to digitise. We now have BIM level 2 mandated by government. That really moved things on, but it is how we continue to move that through. That will start to integrate the supply chain. If you have a fully BIM-functional project right from design and inception, lots of benefits and payoffs—payment, lack of substitution, being able to manage that whole product—will be in improving productivity. There is not one component in the supply chain that will become the salesperson for the whole thing.

As you start to move to that more integrated model, which will be driven by digitisation and the need to improve productivity, because, ultimately, we do not have the people or capital to do it as unproductively as we are, you will then, effectively, start to get your own salesmen.

Having said that, and this goes back to Lord Mair’s question about infrastructure, infrastructure such as the Thames Tideway, Crossrail and, indeed, the Olympics are real exemplars of the industry integrating and delivering something that is substantially better than it would have been by any other means. We have good examples. We just need to be better at talking about them and moving on to the next one.

Lord Vallance of Tummel: Can I follow that up a little more? The Olympics were a complete one-off for all sorts of reasons. I am still back to this business of how you convert the clients. One of the problems is how you get them on board. Somebody has to be responsible for that. I am still back to: who does it?

Simon Rawlinson: Going back, I suppose, to the first point of engagement, typically we influence and shape how we might do things either through a project manager or an architect. You could say that they are often the best advertisers and marketers in the industry, because they are very good at communicating images and great outcomes. There is then the issue of aligning the interests of that designer with that solution. You have met one or two businesses that are very good at that and which have differentiated themselves by being able to show that they are aligned to a new way of working. We will start to see greater recognition that delivering on a product basis greater quality has inherent value.

One thing that I continually reflect on, if one compares where we are now to, say, 20 years ago, is that probably the things of greatest quality that we see in our lives are the iPhones that we carry, the beautiful computers that we have and the watches. We are now in a productised world and we probably need to celebrate that more in an architectural and building world. That would send a very positive message.

Suzannah Nichol: Off-site may not always be the answer. Our client members tell us that they want buildings that work as anticipated, and that are delivered to a high standard and to the required quality and in accordance with the agreed costs in the programme. Off-site manufacture is often a solution to part of that, but it is not necessarily the only answer. It is not about saying to clients, "This is the only answer". It is about the industry saying, "There has to be a smarter way of delivering it".

It is a bit like in many other industries. People often use the car industry as an example. We do not make cars one by one. We used to do that and it did not go very well. It is about the industry saying, "This is what we offer", not asking, "What do you want?", so part of it is about the industry taking responsibility. It is not just selling to clients that it is the best thing on offer.

Again, I would liken it to when you buy something. You do not specify what tin of baked beans you want. There are beans on offer and you choose which works best for you. It is to the required standard, it has met quality specifications and there is a system to buy it. You do not have them handmade every time. The industry needs to take a look at itself and say, "How do we offer something that is smarter?" It comes back to breaking the circle and which comes first: buying it or providing it?

Lord Hunt of Chesterton: Perhaps you have covered this before—Lord Mair mentioned it—but I still do not quite understand the role of the Government. When there is a new project such as a prison or whatever, do the Government say, "We want to have a certain percentage of this produced by off-site manufacturing"? In what way are government agencies, and which government agencies, demanding higher standards and efficiencies? Which Ministry does it—it is not the Building Research Establishment—or do these objectives come down from each government department as they are building each little thing?

Dr Diana Montgomery: A number of government departments have a presumption in favour of off-site manufacturing, so for schools and hospitals that presumption is there.

Lord Hunt of Chesterton: What does that mean? What is the percentage outcome on that?

Dr Diana Montgomery: That is a very good question. There is what is called a presumption in favour and there is a balanced scorecard by which things are supposed to be procured, but there is a big gulf between what is said and what is done.

Lord Hunt of Chesterton: What is the number in terms of output?

Simon Rawlinson: The criteria are subject to a value-for-money measure and are not applied until 2019, so there is an element of the departments building up the skills to be able to do this.

Lord Hunt of Chesterton: We heard a lot about prisons before, but we never got a number.

Simon Rawlinson: I do not think anybody has said so.

Suzannah Nichol: I am fairly certain that the GLA does it, but you would need to go back and speak to Mark Farmer, as he may he have raised it. A simple example would be the same roofing contractor delivering three different roofs on three hospitals, all procured by the public sector. He would sit here and say, "You want me to look at manufacturing that in a different way, perhaps off-site or through more components. You want me to get better at delivering that, but each hospital has a completely different design and a completely different roof". You talked about skills. We are doing a different job three times, whereas if it had been some kind of off-site or specified solution, by the time of doing the third one we would be rocking and rolling through delivering that. Instead, it is a whole new game for everybody out on site.

Lord Hunt of Chesterton: What do the Government say while this is happening? Are they monitoring this process or saying, "My goodness me, why don't you work together"?

Simon Rawlinson: That illustrates a great challenge, because we know that health trusts are devolved, so the ability of, say, the Department of Health to influence compared to the ability of the Ministry of Justice, which directly builds prisons, is a little limited. Those are some of the challenges which the government clients face. They also have to percolate these skills down into their organisations.

The Chairman: Who do you suggest might do this?

Simon Rawlinson: To start with, you have the Treasury and the IPA.

The Chairman: No, who do you suggest should do this?

Simon Rawlinson: There are three groups of client. I would have the government public sector using the equivalent of the mandate for the BIM level 2, which is: "We're going to test people against whether they have bought a certain level of off-site manufacture". I would want the city authorities to start getting the people who operate within their regions, housing organisations for example, to start pooling their work, and you would want to see the large house builders in the quasi-public sector, particularly the RSLs, start doing that.

Lord Kakkar: Is not the problem that in the public sector if you are building the same building, say a hospital, in three different locations, you will have three different roofs. What would you say to a Government about kick-starting this and giving it huge impetus?

Simon Rawlinson: The first element is that you standardise what you can. There is a very good example from ProCure22, I think it was, where the contractors came together and developed a standard ward unit, so rather than having lots of hospitals with lots of different wards they all had the same one, and everybody could start to minimise their design effort. It might still be built in situ, but it was a common component.

You can do those. You might not be able to do the roof the same because of planning constraints. You need to find the things that are common and focus on those.

The Chairman: Why do you not say straight out that you would like all government procurement to be off-site construction?

Simon Rawlinson: Because the result might be the law of unintended consequences; you get suboptimal results, there is not enough capacity, or you get the wrong product. You want people to specify intelligently. Some of the evidence that you have been provided with on platform-based design and delivery, where people bring components together, which creates flexibility and ability to scale quickly, would be a more intelligent approach, rather than saying, "We want everything to be done off-site". You need that blend. It is about an intelligent response from clients, consultants, contractors and specialists to improve productivity and the quality of outcomes. That is really what we are about.

Suzannah Nichol: There is also a very clear role for the industry here. We have the opportunity through things such as the industrial strategy challenge fund and use of the Manufacturing Technology Centre. A really good outcome is not just about specification. Specification is a big part of it, but I completely agree about unintended consequences. We did a lot on the schools programme, where we had more consistent schools. However, that falls away when different people are allowed to ask for it. You can have individual schools no longer having to follow those requirements.

The industry needs to be stronger and stand up and say, "This is a better outcome for you. This is the right answer to your question. This is what a good school looks like", and finding a way of not stifling innovation but delivering really good outcomes. That is really difficult when the client says, "I don't want that. I want my school to be individual to me or to my local area", even if it is not the right decision.

Lord Mair: We are focusing on the phrase "presumption in favour of". When the Government say to five government departments, "There will be a presumption in favour of", there is a caveat attached to that, is there not?

The Chairman: Dr Montgomery, you have used that phrase.

Dr Diana Montgomery: I was merely quoting. This comes back to needing to do what is said. The best example, which we have talked about several times, is mandating BIM level 2, and that means that all projects have started to move toward BIM in both the public and the private sectors. The Government have the ability, by saying that they have a presumption in favour of off-site and will use a balanced scorecard to procure, to start procuring against whole life to procure better-quality buildings. As Simon said, it is not about prescribing that it has to be completely modular off-site, it is about defining, and the balanced scorecard does that very well in defining what good value, highly productive, safe, lower-carbon buildings look like and allowing the industry to innovate to deliver that. BIM is the best example.

The next piece is taking the balanced scorecard and the presumption in favour of off-site, and I would rather it was called smarter construction than off-site construction, because that starts building all the technology, and asking government departments to report about how they are procuring against that. It is the old adage of what gets measured gets done.

The Chairman: Thank you very much indeed. I have let you go a little longer than I should have. Thank you very much all three of you for coming to help us.