



Select Committee on Science and Technology

Corrected oral evidence: Off-site manufacture for construction

Tuesday 5 June 2018

3.25 pm

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Members present: Lord Patel (Chairman); Lord Fox; Lord Griffiths of Fforestfach; Lord Hunt of Chesterton; Lord Kakkar; Lord Mair; Lord Maxton; Baroness Morgan of Huyton; Baroness Neville-Jones; Lord Renfrew of Kaimsthorn; Lord Vallance of Tummel; Baroness Young of Old Scone.

Evidence Session No. 9

Heard in Public

Questions 64 - 70

Witnesses

Tony Meggs, Chief Executive, Infrastructure and Projects Authority; Ann Bentley, Global Practice Director, Rider Levett Bucknall; Martin Chown, Infrastructure Client Group.

USE OF THE TRANSCRIPT

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

Examination of witnesses

Tony Meggs, Ann Bentley and Martin Chown.

Q64 **The Chairman:** Good afternoon, lady and gentlemen. Thank you very much for coming to help us with this inquiry into off-site construction. Your evidence will be very helpful to us. Before we start it would be helpful if you could introduce yourself and tell us who you are for the record. If any of you would like to make a brief comment—and I mean brief—please feel free to do so.

Tony Meggs: I am the chief executive of the Infrastructure and Projects Authority in government, which reports to the Treasury and to the Cabinet Office. Our job is to improve the way in which projects and infrastructure are delivered in government. We oversee all the Government's largest infrastructure projects and other types of project. I am very happy to be here.

Ann Bentley: I am global director of Rider Levett Bucknall. We are project managers, cost consultants and building surveyors working both in the UK and internationally. I also sit on the Construction Leadership Council, which provides advice to government on construction matters. From my position on the CLC, I have a particular interest in procurement and productivity.

Martin Chown: Good afternoon. I am the supply chain director at Sellafield, a large, complex nuclear site in the north of the UK. I also sit on the Infrastructure Client Group and I am here to answer any questions you might have on that. We sit together as some of the largest infrastructure providers in the UK to join forces and to collaborate on where we can to make the industry better.

Q65 **The Chairman:** Thank you very much indeed. I will kick off with the first question.

In virtually all the evidence that we have heard now there has been a great deal of enthusiasm for more projects to be done using off-site construction. But possible barriers have also been identified, and we would like your views on how you think these might be overcome. What in the business models in the construction sector needs to change? Secondly, companies in the construction sector need to be more collaborative in lots of areas, including in skills development. Thirdly, the cash flow and financing in the sector need to change; in other international construction companies, finances are managed better.

Those are the three key barriers that we have identified and that need to be overcome if we are to have more off-site construction.

Tony Meggs: I am happy to kick things off, if I may. The barriers that you refer to are becoming reasonably well known. Just to supplement that a bit, we have a track record in the industry of working with government to procure for the lowest cost rather than for best value.

That has driven a set of behaviours in the industry that are not very collaborative, in that we try to move risk down the value chain.

The second area is aggregation. For this type of technology to take hold we need multiple projects and longer time horizons. Currently, the industry runs largely on the basis of individual projects in which the incremental up-front costs of off-site manufacturing cannot always be justified. I think we need to move to a more collaborative approach where more risk is shared and to an approach within government where we can look at multiple projects over multiple years and aggregate potential demand for off-site construction in a way that is not done at the moment.

The Chairman: How do you bring about more collaboration among companies?

Martin Chown: The Infrastructure Client Group has developed a new model for construction called Project 13. We launched it in early May, although it has been in development for a while, with lots of companies contributing to what it could be.

Essentially, Project 13 is a change to how we can go to market and procure on a more collaborative basis, right from the start of the need for construction. It seeks to establish what is required from the infrastructure and then for us as clients to come up with better models to drive that collaboration within the supply chain. It sets us out very clearly as the owner and sets out what we want from the asset and how we want it to perform over its life cycle. It sets out how the supply chain can be constructed and, as Tony said, how to do that over multiple projects.

The clients around the table of Project 13 come up with models in which suppliers can work on many projects, both large and smaller, and can go from one project to another building on that success. We feel that that enables innovation and productivity and a knowledge to be built in from one project to another. It takes time to be able to do that. The kind of long-term arrangement that we are building through Project 13, and in our own organisations around the table in the Infrastructure Client Group, is key to driving collaboration in the supply chain.

This also takes into the account the third area that you mentioned, cash flow and risk and reward, because it has to be based on payment and profit for performance and outcomes. That is the model advocated as part of Project 13 by the Infrastructure Client Group, and many of the people around the table are driving it forward in their own organisations.

Ann Bentley: Going back the first part of your question, there are already very many business models out there and they depend very much on which sector of the market you operate in. The housebuilding model is very different from, say, the commercial development model, which is very different from the infrastructure model. That is quite important to begin with. In some of these models, there are already significant amounts of off-site construction. In fact, in the commercial model something like 80% of all components brought to site already have

some level of off-site manufacture to them. That is an important point to make.

From a construction adviser's point of view, our biggest challenge in promoting off-site construction is the need for competition. Many of the funders of the construction that we work on, whether they are private sector or public, have very high levels of scrutiny for how the contract was let. Did you go out to market? Did you get competitive bids? How is this placed in the marketplace? One of the demands of the off-site model is that you get to the point of freezing the design very early in the process, so you are quite limited in the number of contractors you can go to. We find that a lot of our private sector clients are loath to commit to a single contractor very early in the process and want us to continue with the design development until they can get to the point at which they can go to market.

Lord Fox: You alluded to the different reaction in different sectors. Would you say that commercial has more potential for this than homebuilding, and where should we target effort—the public sector or the private sector?

Ann Bentley: I would say that it is more value based than necessarily sector based. It is really what Martin was saying. If you have a programme of projects or a single project that is worth in excess of £50 million, you can pretty much specify whatever type of construction you like. It is big enough that somebody could set up the process for it, standardise it or whatever. It could be 50 £1 million projects or one £50 million project. If you are looking at one £1 million project, there is nothing standard about it, so it is very difficult for anybody to advocate—

Lord Fox: Is £50 million an illustration or a real figure?

Ann Bentley: It is an illustration, but that is the order of magnitude. It is not £10 million. At that magnitude, it is worth the market reacting to the procurement type.

Martin Chown: If I could just contribute to that. There is value across many sectors—in fact, all sectors. The approach is different, but I have seen successful off-site manufacturing in student accommodation. Again, there is a repeatability to the schemes. Sometimes the schemes are larger and sometimes they are smaller, but essentially they are the same, converting a disused office building or a new build into quality student accommodation with modular bathrooms and that sort of thing. With my previous employer I was involved in 30 or 40 of these schemes. The benefit does not come in schemes one, two or three but in schemes seven, eight, nine and onwards. That is when you really see the benefit and cost coming back from the off-site manufacture.

For highways and rail infrastructure, parts of the gantries and control systems can be successfully manufactured off-site. All those types of structures, including bridges, can be considered for off-site manufacture.

The sector I am in at the moment is large infrastructure buildings. Interestingly, our classification of a major project is over £50 million. There, we have used off-site manufacture to build large, heavy

installations—even 500 tonnes—that were then inserted into a large process building. I have seen different approaches that have been more or less successful over smaller, low-cost builds, right the way up to £700 million-plus projects. The approach and the lead time to benefit are different for each of those projects in each sector, but none of them is immediate.

Lord Griffiths of Fforestfach: Let me just clarify in my own mind your answer to the question about competition. Are you saying that if we were to move to greater use of off-site manufacture and a more collaborative approach with shared risk, there would inevitably be a reduction in competition?

Ann Bentley: No, I am not saying that. I am saying that that is the perception. That is the crux of the issue. Many of the clients we work for believe that the only way we can demonstrate competition is by having a competitive tender on a completed design, if I am honest. I am not saying that that is what all clients believe, but many think that that is how you ensure best value.

I advocate almost the complete opposite. I think you will get better value and still have competition if you go to the market much earlier in the process, because you will get much greater buildability and input from the people who will build it. But the perception is often not like that. We talk about the knowledgeable, educated or competent client, but one-off clients are even more likely to believe that. A client who procures lots of things a lot of the time is clearly an expert client and understands this. One-off clients tend to say that they just want to tender it and see what turns up.

Q66 Lord Renfrew of Kaimsthorn: What actions are needed from the Government, perhaps through the Construction Leadership Council, and from the construction sector to help to increase the use of off-site manufacture? It was disappointing, I think, that the Government did not give the full detail of the sector deal when they made their announcement in the industrial strategy White Paper six months ago. There was a press release that spoke of the objectives of reducing cost, reducing time, reducing greenhouse gases and the trade gap. What do you feel the sector deal should contain to meet these objectives?

Tony Meggs: Talking a little more widely than just the sector deal, I think there are four key necessary and helpful things. One is the need for more research and development, which is part of the sector deal. That is research and development in manufacturing techniques as applied to building. The second, which Ann referred to, is better practices in procurement and a more collaborative approach with much more work together up front. We are pursuing this partly through Project 13 and through our own government initiative, Transforming Infrastructure Performance.

The third area where we can play a real role is aggregation of demand. As the others have said, if you just have one-off projects it is very difficult to justify the up-front investment of time and money to use really

modern methods of construction. If we can aggregate demand, as we can in government by looking across different departments, you can demonstrate the benefits of this approach much better. That is why we have included this so-called presumption in favour in five government departments. That means that they will look first and foremost to using modern off-site construction methods, along with other routes but with a preference for that, provided that it stacks up.

Finally, and down the road, is the development of a library of standardised components. Not to make it sound too much like Lego, but we can see lots of opportunity for developing various platforms that will allow many different types of buildings and things to be constructed from a base number of components. We in government are planning to work on that over time.

Lord Renfrew of Kaimsthorn: Thank you. You mentioned Project 13, about which I have been reading. I am not quite sure of its status. It is clearly very well intentioned—it has almost a piety about it—but who exactly is it directed towards?

Tony Meggs: I will let Martin answer that.

Lord Fox: The high priest.

Martin Chown: Project 13 is directed towards infrastructure clients in the UK. Three hundred people and over 140 organisations contributed to Project 13, including many—

Lord Renfrew of Kaimsthorn: Sorry to interrupt, but why is it called Project 13? The title is striking.

Martin Chown: I am afraid the answer is painstakingly dull. It was the 13th project that we led from the ICG.

Lord Renfrew of Kaimsthorn: Fair enough.

Martin Chown: I was curious myself and I asked the same question.

There are four reasons why we developed Project 13 and why it is important for off-site manufacturing and other methods of productivity, and I will cover those briefly, if I may. It provides the scope to drive the efficiency in the supply chain investment, so we add in scope through Project 13 for multiple projects, as I described in an earlier answer. It builds on longer-term relationships. With those longer-term relationships there is investment in advanced manufacturing methods and the products that are required. It has integration at its centre, so we integrate the suppliers and they can compete within it, but not in open competition in the way that Ann described; they are part of the delivery of the outcome. The fourth reason is that there is earlier strategic engagement with the suppliers so that they are there.

One feature that we have found of off-site manufacture and other production methods is that it is not taking what we do on-site and simply moving it off-site; it looks at it right from inception so that things are designed to be manufactured off-site. There is a marginal benefit to safety by moving things off-site, which of course is important, but the

best benefits that we can get are through designing things to be made off-site and then building the efficiencies as things arrive on site.

Project 13 launched on 1 May. We have three pilot projects running with it, and we already have the next three. The principles of it are already being embedded in most of the large infrastructure clients. There are 25 large infrastructure clients in the UK already embedding the principles.

Lord Hunt of Chesterton: In this Committee we have been learning about what I call the Griffiths conundrum as to where the Treasury is. It is like Alice in Wonderland: is it on the outside as the funder or is it on the inside trying to move things? In this document here, the Treasury is hardly mentioned, so we do not know what it is doing. How is the central government push happening in this project and in the whole business of introducing these new methods?

Tony Meggs: Can I address that, as somebody who works at least partly for the Treasury? Curiously, we report both to the Treasury and to the Cabinet Office, so in a sense we are helping the Treasury. At the end of the day, the Treasury is clearly interested in value for money. It is also interested in productivity. Therefore, it has a very keen interest in what we are trying to achieve.

We have an initiative, although I hesitate to call it that, in the IPA called Transforming Infrastructure Performance. It has four components. The first is benchmarking to make sure that we are competitive. The second is about integrated development and ensuring that houses, trains and so on are built in a co-ordinated fashion. The third is about better methods of procurement. The fourth is to do with technology, including the use of digital technology—BIM, which you have no doubt heard about—and modern methods of construction. These are the four axes that we are pushing on behalf of central government. We work with lots of departments and with industry so that all that we are doing is lined up with the most advanced current industry thinking.

Within that big programme we have lots of effort under way. Again, that builds on an industry desire to do things differently. For example, we have set up a working group that works across several departments to share best practice on methods of construction and, I hope, to aggregate demand. There is a lot that we can do. We have set up a team within our organisation to help to drive this forward for government, as the biggest client in the country for infrastructure.

Lord Mair: Can I follow up on that? You made a good point earlier about the aggregation of demand, and you mentioned the presumption in favour for the five departments, which the Government have talked about, providing that there is best value for money. I guess that is a very important proviso.

Tony Meggs: It is an important proviso.

Lord Mair: Can you say a bit more about the presumption in favour and tell us what it actually amounts to? We have potentially five government departments. What would the presumption in favour mean in terms of pushing forward this agenda?

Tony Meggs: It is obviously an excellent question. It means that we will work with all those departments, and they will all work together through the working group that I mentioned, early on in the evaluation phase. As you know, with all government projects we require people to develop various options so that the best option can be chosen. In that option selection process we will require the departments that have committed to this to having at least one option that includes the substantial use of off-site manufacture, and I mean modern methods of construction and more advanced approaches.

Our job then, as a practical matter, is to help with that evaluation, by which I mean that where we can see the wider societal benefits of looking at a larger portfolio we will introduce that into the considerations to make sure that the evaluations are done in a forward-looking way.

To clarify that, one project on its own often cannot justify the necessary investment that a group of projects can. By using this presumption and the aggregation of demand across those departments, we will be able to amortise the investments over a larger pool of activity.

Lord Mair: You used the phrase “require the departments” to have at least one option involving off-site manufacture. How would that requirement work in practice?

Tony Meggs: That is yet to be seen. In fairness, all those departments have used various forms of off-site manufacturing already, so this would not be earth-shattering. What will be different on this occasion is that we will be looking for more advanced methods, so not just a few bits of off-site but across the entire manufacturing chain. We will undoubtedly work with those departments to make sure that they have considered the most up-to-date technology approach and that they have all the learning from across the industry and from other departments and places where it has worked. I am clearly not doing a very good job of describing the anatomical details, but it is about collaboration.

The commitment is meaningful. It sends a signal to industry that we are serious. We did not twist the departments’ arms; they made these commitments of their own volition.

Lord Mair: To follow that point, are you saying that they would in effect be held to account if they did not consider off-site manufacture? Would some sort of questions be asked if they did not?

Tony Meggs: All these projects have to get funding approval from the Treasury, and as part of that process the departments are required to have done a thorough evaluation of off-site and modern methods of construction. If they have not, working with our friends and colleagues in the Treasury we will ask them to have another go.

Ann Bentley: I think the key to that question is: where does the wider social value sit? I am pretty sure that anybody with a calculator could make the argument either way, for either off-site or conventional, depending on what you are actually measuring. If you are absolutely measuring unit cost at the point of supply, traditional construction methods may well come out cheaper.

But if you add in long-term value, quality, local employment, health and safety, and lots of slightly less tangible things—they are not intangible, because they can all be measured, but they are not quite as in-your-face—it becomes a much more complex matrix.

That is the question that I think the Treasury has to be asked. It is not: which is cheaper, A or B? As I said, anyone in the room could make A or B possibly cheaper depending on which factor you come at. It is about which factor is most important.

Lord Kakkar: Just to be clear, are we to understand that the Treasury does not ask any of those questions as part of its enthusiasm for the presumption that there will be off-site manufacture?

Tony Meggs: I would not like to cast any aspersion on the Treasury. I do not think it has been a major theme in the Treasury so far.

Lord Kakkar: But then this presumption we are hearing about is slightly meaningless, is it not?

Tony Meggs: This is new. We have not had any cases through the Treasury since this presumption was introduced.

The Chairman: I think your response has excited quite a lot of Committee members, so I suggest that they ask very brief questions and that we please have very brief answers before we move on.

Baroness Morgan of Huyton: It is okay. My question has been answered.

Lord Vallance of Tummel: This question is just a quickie. The Treasury will understand the concept of externalities, which Ms Bentley talked about. One of the biggest ones in their objectives for the sector is a 50% reduction in greenhouse gas emissions in the built environment by 2025. That is huge. Surely in assessing the procurement of a government deal, that should be quantified and be part of it.

Ann Bentley: My answer as a construction adviser is absolutely yes, it should be. If your question is whether it always is, the answer is not always.

Lord Fox: I started to get agitated as we moved in this direction, because it seems to me that we are looking at the wrong end of the telescope here. We should not be worrying about how we build but about what we build and the quality of what we build. If we were to exert higher standards for on-site waste, construction safety and the safety, quality and environmental performance of the final building, would that not be a better way of driving better building techniques, one of which would be off-site manufacture?

Ann Bentley: It would be an equally good way.

Lord Fox: Equal to what?

Ann Bentley: To factory produced.

Lord Fox: That is what I am saying. If you put higher standards in, you will inevitably drive the industry towards more collaboration. In a sense, I

am asking for support or otherwise for a standards-based approach to creating all the other changes that we are discussing.

Ann Bentley: Again, from my perspective both on the CLC and as a construction adviser, absolutely. At the moment, there are examples in both the private and the public sectors of very poor-quality design, construction and procurement. But they are cheap.

Martin Chown: The Infrastructure Client Group and the Institution of Civil Engineers have a role to play. As well as standards and the involvement of the Treasury, which is always welcome in advising us how to proceed in the most cost-effective way, we have a role to drive it forward for ourselves. We have the self-motivation to save the taxpayers money and to deliver the best value that we can.

A recent example is a store that we built in our facility in Cumbria. Previously, we would have designed a store and tried to build it. To build it successfully would have taken time and money. We looked at the industry around us and found that someone else had built an almost identical store; it was a slightly different size but very similar in concept.

We built the same store—they are almost identical, but ours is slightly larger—and we optimised it. We did not specify materials; we just used industry standard direct from the factories. The store came in at about £10 million cheaper and a year early. That is a strong achievement and an example of us using other clients' work and copying it for the benefit of what we are trying to do.

If the Infrastructure Client Group and the Institution of Civil Engineers can promote that kind of work from the ground up and roll it out through Project 13, we will get a lot of traction. Support for Project 13 and how we want to do things can be client driven, both in the public sector and in the private sector, as well as driven by the Treasury, the Cabinet Office and Tony's organisation.

Baroness Young of Old Scone: How is presumption going to be measured? It seems to me that the method of measuring the successes of presumption will determine what will be taken into account. Is there clarity about how it will be measured?

Tony Meggs: Quite honestly, I think it is too early in the process to be specific about that. I will measure it in terms of how many projects adopt modern methods of construction. I would not expect it to be universal, but I would expect it to increase over time. We have not set any targets at this stage, because it is too early in what for us is a new initiative in government.

Q67 **Lord Hunt of Chesterton:** What actions are needed from clients to help to increase the use of off-site manufacture? A couple of weeks ago, we went to a factory that makes off-site equipment and they told us a story that is the opposite of yours. They told us about building all these schools in Yorkshire using off-site methods, but that in the next round of bidding they were not chosen, for reasons that were completely unclear.

One wonders how clients can be educated and informed about the potential benefits of using off-site manufacture. I imagine that the Treasury might want to look at that on a bigger scale. It is a palpable example and it was clearly very disheartening for a company that had made such big investments.

Martin Chown: To try to answer your question, I believe that, further to Ann's point, that project and some others have been re-competed, so they built some knowledge and have been re-competed. Clients could look at their needs over a longer period of time and understand that off-site manufacture requires repeatability and has a long-term nature, and that benefits will not always come in schools one, two or three but definitely will come in schools four, five, six, seven, eight and beyond.

So going to market with a procurement model that is cognisant with what you want to achieve over the longer term and building in scope for where you want to go, then allowing that long-term relationship to build and develop without having to constantly compete or re-compete, as I believe happened in the Yorkshire schools model, is for me the way to go. The clients can understand their requirements, require an off-site manufacturing plan and use the principles of Project 13.

For me, that should come in very early in the day to the market-facing structure. Procurement colleagues, and I sit in that world myself, need to be very careful about what we can achieve over the longer term as opposed to going to market every year or every two years to try to re-compete and save some money.

Ann Bentley: I think that the Crown Commercial Service has a really big part to play in this, because a lot of public procurement, not so much on the infrastructure side but more on the residential side and in smaller facilities and education, is done through that service. Historically there were hundreds and hundreds of different frameworks: a framework for police stations, a framework for schools in Lancashire, a framework for this, that and the other. Each one would be subject to serious competition.

The Crown Commercial Service is now trying to combine a lot of these frameworks into much meatier national frameworks. Each framework would then probably have a lot of suppliers on it, because it is not trying to get rid of competition; it is trying, as Tony said, to aggregate the market. Once you know that you are a supplier on that framework and that it is perhaps for five years with a possible extension to seven years, you can start an investment programme, because you know that you are one of the framework suppliers. You might not know exactly which schools or hospitals you are going to build, but you will know that, as you are on the framework, you are in with a good shot of getting a percentage of that work.

In terms of what government supply bodies can do, the work of the Crown Commercial Service is significant. It is broadening and extending the framework, which means that it will be far more attractive to these economies of scale.

Tony Meggs: May I just make a couple of points? Over the last few years, the Government have done quite a good job of increasing the length of these. Highways, for example, used to have an annual plan. Now we have five-year plans, and similarly in rail and so on. That has really opened up the opportunities for longer-term and more collaborative relationships. That is point number one.

The second point goes to part of your question. Part of our job over the next few years is to improve the understanding of the economics here. Right now, as Ann said, if you look at all the evidence, you can come up with any answer you want as to whether it is a good idea or not. We need to build the evidence base and be much clearer not just about the societal benefits but about the economic benefits of taking a long-term manufacturing approach. Fundamentally, it is about improving productivity, but it is going to take quite a long time for those benefits to be clarified.

Baroness Morgan of Huyton: That was my question, which in a sense is about pace. How directive are you being—I am thinking about Mr Meggs really—in, for example, setting out that there should be a move towards value rather than initial capital cost? To what extent is that being driven through the system, or is it a more discursive, working-group approach? It seems to me that time is somewhat of the essence when it comes to driving productivity, and we have not even talked about the domestic housing market and the urgent need to drive productivity there.

Tony Meggs: I have been asked this question several times. In some areas we have taken quite a directive approach: in the use of BIM, for example, which is an enabling technology that we have mandated. Even with making it mandatory, it takes several years for it to spread through the industry. We started that in 2011 or 2012 and it has achieved real momentum now.

In this case, I realise that it feels a bit fluffy, but we are not in a position to mandate this right now. First of all, it is not always the right thing to do and, secondly, the industry capacity does not exist. Thirdly, the right sets of standards are not in place to make it a ubiquitous technology. There is a lot to do over the next few years to improve understanding and research and to set standards. We have a sense of urgency and the industry has a sense of urgency, but it is a large, complex and amorphous industry.

At the end of the day, I think there is a lot of good will here and a desire to move this forward. I would not like to come in with big heavy boots and turn it from something that people want to do into something that people are forced to do—not yet, anyway.

Ann Bentley: To take your point about value, which was at the heart of your question, I would say that the people who are most successful on that are the infrastructure clients. These are the people who have longer-term funding arrangements—

Baroness Morgan of Huyton: So in a sense they are driven to being more able to do it.

Ann Bentley: Yes, because they have longer-term funding arrangements and they are asset owners, so they see the direct benefit of the cost savings. If it is a long-term cost saving rather than a short-term cost saving, clearly if Highways England or Sellafield realise that spending an extra couple of quid saves them £100 a year for ever, they have the ability to do that. In single projects, that is much more difficult.

Baroness Morgan of Huyton: Why cannot that be understood by housing associations, which you could argue also have the long-term relationship?

Ann Bentley: This is now opinion.

Baroness Morgan of Huyton: That is fine.

Ann Bentley: I think that if there was a move to desire housing associations to do that, Homes England would have quite a strong role to play. One of the issues with housing associations is that they still have their own design standards and procurement standards. That is not necessarily a bad thing, because they address local markets, but if you want national economies of scale, you might have to accept that you have to give some of that up.

Lord Fox: On a point of clarification, I thought I heard Mr Meggs say that he did not want to force the issue on value assessment, because there is not the capacity in the industry to do it. It seems to me that you do not need off-site manufacture still to be forcing the point that we should be looking at the value rather than at the point cost of a development.

Tony Meggs: I am sorry, I may have misspoke or misled you. I meant that we should not at this stage be forcing off-site construction or modern methods of construction.

Lord Fox: So the "it" was off-site.

Tony Meggs: Absolutely, we should be forcing whole life value considerations.

Q68 **Lord Vallance of Tummel:** Much of the evidence that we have received so far has been about buildings of one kind or another. Be it small or big, it is vertical. Perhaps you can tell us a bit more about the horizontal. Does that offer the same scope for off-site manufacture? Are there different characteristics? Is it easier or more difficult to aggregate schemes of this kind?

Martin Chown: There are certainly different challenges in the vertical infrastructure sector. There have been some notable successes in off-site manufacture and standardisation across the Metrolink trams in Manchester, where there were 52 platforms and most of the work and features were standardised across the platforms. At the Canary Wharf Crossrail station, the whole platform was manufactured off-site and dropped down in situ, and Heathrow is looking extensively at where it could do off-site manufacturing.

Driving economic growth in different areas is part of that off-site manufacture. Highways did a lot of work on standardising the gantries

that sit across all the motorways. Where there are standard features that could be applied for multiple schemes, there is a very strong case for the off-site manufacture of vertical infrastructure. The cost benefit of that is starting to develop and some of the case studies are quite strong.

Where you are starting to put things into the ground or have more of an interface with the ground geometry, things become more variable and off-site manufacture becomes more difficult. But where features can be established and different sizes of features can be done through modular construction, there is a very strong case for using advanced manufacturing techniques that are both off-site and on-site for the linear infrastructure.

Lord Vallance of Tummel: Is the industry structure the same or is it more integrated than perhaps on the vertical side?

Martin Chown: Most of the clients that I interface with on the Infrastructure Client Group are very like-minded. Those of us who are building large structures and dealing with highways or rail have looked at each other's models and seen that we share similarities in our long-term goals. Our thinking, desires, collaboration and incentive models are developing in the same types of ways, which suits the drive for off-site manufacturing.

Lord Vallance of Tummel: So there is not the same drive to pass the parcel of risk from one element to the other, is there?

Martin Chown: Different risk models have been used, but in Project 13 we advocate risk sharing as opposed to risk transfer. We believe that driving an outcome where both parties are cognisant of the risk and you drive through the project to mitigate and diminish that risk, and there is profit to be had on achieving better outcomes, is the best way.

Tony Meggs: I would answer that slightly differently. The industry is quite disaggregated both vertically and horizontally in all sectors, quite frankly. From a government perspective, our historical approach, not universally but a lot of the time, has been to move as much risk as possible down the chain and away from government. There are lots of good reasons for that, such as not wanting to be on the front page of the *Daily Mail*, and so on, but it does not necessarily produce the right outcomes.

It is a substantial cultural shift for government to embrace a more innovative approach where collaboration with the supply chain can produce better outcomes for all, including better commercial outcomes for the suppliers and for the client. That is the basis of Project 13. But it is non-trivial if you are used to living in a world where your job is to get rid of as much risk as possible.

Lord Vallance of Tummel: But you do not see any real differences between the horizontal and the vertical.

Tony Meggs: I am talking about the social infrastructure sectors versus the economic infrastructure sectors, but not really.

Ann Bentley: I see a difference in the way risk is handled. The majority of the large infrastructure clients have a much better acceptance of the concept of risk sharing than many of the commercial clients, and a lot of the commercial clients' attitude to risk is pushed by their funders. If you are borrowing all the money, clearly the funders will have a very different view of risk and of the return on their investment than if you are building any number of railways and have a longer term over which to distribute the risk. We certainly see a difference depending on where the money has come from rather than in relation to what is being built.

Lord Vallance of Tummel: That is very interesting. Thank you.

Q69 **Baroness Morgan of Huyton:** Can I ask you about skills and workforce? Obviously we know about the shortage of skills even in relation to traditional methods in the construction sector, that it is ageing and that with Brexit it will get more difficult.

Taking that as a starting point, to what extent do you see a need for a completely new set of skills for the new world, and how do you see that being developed? Will it be developed alongside, or can we retrain people? Paint a picture on the skills side, if you will.

Ann Bentley: My take on it is that it is about the really significant elements of off-site as opposed to a few percentage elements off-site. There is also a big point about whether it is UK manufactured off-site or overseas manufactured off-site. Going back to my commercial building example, once you are out of the ground, in truth probably 70% or 80% of it is already manufactured off-site but not necessarily in the UK. So there is an issue to do with where the skill base is and what the skill base is.

Certainly the evidence—I am talking about commercial and residential buildings—is that the training needed to get an off-site operative in a manufacturing facility up to a very, very high level of competence takes months, not years, because the very nature of the manufacturing process is that it is repetitive and it has a degree of quality control built into it, so you need very clever people to set it up. But once it is running it is relatively easy to train people over a relatively short period of time.

Clearly there is still a need for site operatives and they will still need general site training, but a lot of the main contractors are now talking about multi-skilled operatives—people who can do many trades on-site rather than just one. That is a retraining programme to some extent. Clearly you will bring new people in, but you will have to retrain some of your existing people.

Tony Meggs: I agree entirely with Ann. However, I do not see it as a wholesale “We’ve got to get rid of all of these and do all of that”, because it is a huge industry, and there will still be lots and lots of conventional work and there is a quite a big rate of attrition. So there is tons of opportunity for new people with new skills to come in. Some of them will come from other sectors and have manufacturing and digital skills in particular.

Lord Hunt of Chesterton: I used to run the Met Office, and it was interesting that when we had a big project we were told by the Ministry of Defence to use the techniques that we had, and we just used them. There was no looking at all sorts of possibilities. They did it, they did it cheaply, and they howled to have to do it as cheaply as the big department told them to do.

In other words, this is very different from the view of the Treasury, which could be very touchy, very dodgy, about this. Presumably the big government spending department that deals with Sellafield can get really big projects done in which there is a benefit from each one. Is that not one way in which Whitehall brute force, as it were, can get some big projects done without worrying too much about the finesse of the procedures?

Tony Meggs: I do not think I would describe the Treasury in any way as fluffy or touchy-feely.

Lord Hunt of Chesterton: You should see them.

Tony Meggs: Those are not the words that come to mind. That might be my problem rather than theirs.

Again, the presumption in favour is designed to encourage departments, and they have agreed, to use these methods wherever possible. But to force these methods on every project in a uniform way would not produce the best outcomes. We are in a learning period here, and we will understand over time, as we have with the BIM process, what progress is being made and whether more forceful measures are required.

Lord Vallance of Tummel: We are talking about workforce skills here. What about procurement skills? Do they need to be developed, particularly in the public sector? What about client skills in understanding these different methods? How do we get around that?

Tony Meggs: We have two of the world's best procurement experts sitting here. Doing procurement in the way we would like it to be done and including off-site manufacturing and other things requires sophisticated players. I think the Government are moving very strongly in that direction. There has been a big programme over the past three or four years to bring in a lot of new procurement capacity and capability into government. So we are moving in the right direction, but we still have a long way to go. Of course, we have people like Martin, a leading procurement expert, procuring on Sellafield—a very complex procurement that he has under way right now.

Lord Fox: For a different reason, I had a meeting with David Lidington, and we were talking through the organisation that comes underneath John Manzoni. We were told that there is an extensive process of procurement training going on. Is this on the curriculum of that training?

Ann Bentley: Could I perhaps answer your question in a slightly different way? Earlier, someone mentioned the industrial strategy and the construction sector deal. One of the key components of the construction sector deal is an element called procuring for value. Someone said it is a

shame that it has not been published yet, and I agree with that. It has been written, but it is a real shame that it has not been published, because the answer to some of your questions would come out of that document.

Procuring for value is very much recognised by the Construction Leadership Council, the IPA, the Infrastructure Client Group and pretty much everybody in the industry as being a fundamental tenet of moving this forward. Certainly part of that is that both the advisers and the clients need to be properly trained in it. If they are not, it is just words on a bit of paper. In different ways, we are all trying to move that forward, and if you have any influence in that area, it would be much appreciated.

Martin Chown: Government commercial services are driving forward an extensive reskilling of procurement staff across the whole of government. That is being led from the top, and the whole commerciality of how colleagues in procurement work, whether they are capable of delivering the right outcomes for the department and how they do that is being managed extensively.

It is a large and extensive programme. If people are not of the requisite standards to go forward in that programme, they will not be put into those commercial roles to be able to do it. It is a comprehensive programme with all the right principles behind it to make sure that the Government Commercial Function is a lot stronger across all the departments than it has been in the past. It is being driven very hard.

Baroness Young of Old Scone: I was going to talk about R&D, but I want to ask you a prior question. With your insight, why has the sector deal not been published? What flaw is holding it up?

Ann Bentley: I do not know. It was written in principle by Christmas. The Carillion failure had an influence, but that was months ago, so I do not know.

The Chairman: We will discuss that with the Minister in due course.

Q70 **Baroness Young of Old Scone:** You spoil all my fun, Chairman.

Traditionally the construction sector has invested a hugely small amount, if you will pardon the expression, compared with sectors such as automotive and aerospace. No doubt this will be addressed by the sector deal, I hope, but how can we get more money into R&D, and what areas in the construction sector need more money in R&D?

Tony Meggs: I think that the unpublished sector deal seeks to address this. It is a government injection of £170 million—

Baroness Young of Old Scone: That is pretty small scale.

Tony Meggs: It is pretty small scale, but when combined with the industry contribution it is more than doubling what is currently there. We would waste money if we put in vast amounts. It has to be something that the industry can co-invest in, and it is not rich at the moment, if I can put it that way. One reason why there has been low levels of

investment is the very thin margins. It is a substantial increase and it would be wrong to multiply it by 10 over a very short period.

Baroness Young of Old Scone: What do you see as the priorities?

Tony Meggs: To some extent it is about standards and standardisation, and it is about introducing manufacturing techniques that go all the way from digital models through to components in a factory, as is done in the aerospace and automotive sectors. That is just not commonly done in the UK in the construction sector. Thirdly, there are material developments that could be done. But first and foremost is to enhance the manufacturing process and turn parts of construction into a genuine manufacturing process rather than just building things off-site. There is quite a difference there.

I think there is an opportunity here to improve the taxonomy. When we talk about off-site construction, we mean many different things. Rather as we have BIM level 1, level 2 and level 3—this is just me musing—we need to develop a clearer taxonomy. Off-site construction is very widely used. At some level, a brick is a piece of off-site construction, and we can mean different things when we talk about it. What I am talking about ultimately is the ability to take three-dimensional electronic designs and turn them into products that can be fitted together in many different ways. I do not know what to call that—perhaps level 5 off-site construction. It would be helpful to introduce some real taxonomy here to clarify it.

Ann Bentley: Just to answer your question in a slightly different way, if we have a limited R&D budget we should spend more on the D and less on the R. One issue that the UK construction industry really struggles with is best practice. Again, take Martin's example of simply going to the market to say, "Where was a similar one built and can we just copy it or use somebody else's IP?" We are terrible at that. If you go out to the construction sector, you will find examples of absolutely brilliant technology and operations and off-site. Whatever it is, I could find you a brilliant example of it.

However, our ability to share those examples is quite poor. I am not saying that we do not need research. Of course we do, because you have to keep up with the rest of the world. But we need to ensure that the research that we have already done is spread fairly widely across the sector so that other people have access to that good practice and good results.

Lord Mair: Just a last point to follow that, where would you say the UK sits in relation to the rest of the world on off-site manufacture?

Ann Bentley: It is sector driven, there are no two ways about it. To talk again about the commercial sector, I would say that we are as advanced as anybody. In the high-rise residential sector we are actually quite advanced, and in the low-rise residential sector we are substantially behind Scandinavia, North America and Japan.

The Chairman: Thank you very much, all three of you, for helping us. It has been most interesting.