

Housing, Communities and Local Government Committee

Oral evidence: Modern methods of construction, HC 1831

Monday 4 March 2019

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Members present: Mr Clive Betts (Chair); Bob Blackman; Mr Tanmanjeet Singh Desi; Kevin Hollinrake; Andrew Lewer; Mary Robinson; Matt Western.

Questions 1 - 64

Witnesses

I: Mark Farmer, Founding Director and CEO, Cast Consultancy, Dr Chris Goodier, Director, Centre for Innovative and Collaborative Construction Engineering, Loughborough University and Victoria Pinoncely, Former Research Manager, Centre for London.

II: Ben Derbyshire, President, Royal Institute of British Architects, Ivan Harbour, Senior Partner, Rogers Stirk Harbour + Partners and Chris Millard, Technical Director, Assets and Manufacturing, Laing O'Rourke.

Examination of witnesses

Witnesses: Mark Farmer, Dr Chris Goodier and Victoria Pinoncely.

Chair: Good afternoon and welcome to the Committee's first evidence session into our inquiry into modern methods of construction. Thank you very much for coming to join us this afternoon. I will ask members of the Committee to put on record any particular interests they may have that may be relevant to this inquiry. I am a vice-president of the Local Government Association.

Mr Dhesi: I am a councillor, as per the Register of Members' Interests.

Bob Blackman: I am a vice-president of the Local Government Association.

Andrew Lewer: I am a vice-president of the LGA and chairman of the All-Party Group for SME Housebuilders, and I work with Drakelow



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Development Holdings, as per my register of interests.

Mary Robinson: I employ a councillor in my team.

Kevin Hollinrake: I have business interests in the property sector and employ a councillor in my team.

Mr Dhesi: I worked in the construction industry for well over a decade.

Q1 **Chair:** Now to our witnesses: could you go down the table and say who you are and the organisation you represent today?

Victoria Pinoncelly: Good afternoon. I am Victoria Pinoncelly, a former research manager at Centre for London, which is an independent think-tank. My research remit there was focused around housing. I wrote a report on council-led housing delivery and modern methods of construction, which is why I am here today. This report built on the interview with key stakeholders in the industry, developers, housing providers, architects and investors. Today I speak for Centre for London.

Mark Farmer: Good afternoon, everyone. I am Mark Farmer, chief executive of Cast Consultancy, which is a specialist residential business playing quite heavily in the MMC market. I am also a trustee of the built environment educational charity, MOBIE, set up by George Clarke two or three years ago. I am the author of the Farmer Review from 2016, which was an independent Government review into the construction of labour model, titled *Modernise or Die*. I also chaired the MHCLG MMC working group looking to expand use of MMC when it comes to mortgage finance and insurance availability.

Dr Goodier: Good afternoon. I am Chris Goodier from the University of Loughborough. I am a civil engineer and builder by background. I started my career building and then inspecting off-site structures and buildings when I was a graduate. I have worked at Loughborough for about 15 years doing research into different forms of off-site, modern methods, prefabrication, innovation and construction.

Q2 **Chair:** This is probably a fairly obviously question but one that at least ought to clarify what we are talking about: what do we mean by modern methods of construction?

Mark Farmer: I will offer a suggestion there. It is relevant to the work of the working group that I referenced I was the chair of. I have been chairing that group for MHCLG for the last 13 months. One of the objectives of that group, set by the Housing Minister, was to try to regularise and standardise the language we use when it comes to this entire debate about MMC. One of the things we have evolved, which is being launched in the next few weeks by the Ministry, is a formal definition of modern methods of construction.

What we have come up with is a seven-category range. It is a spectrum of different approaches and it is focused on housebuilding and homebuilding, so it has a residential bias. It spans everything from what



you probably would ordinarily picture to be modern methods, like volumetric modular construction. The idea of parts of buildings or entire buildings coming on the back of lorries and being craned into position is one end of that spectrum. It carries through to a wide range of different techniques that involve parts of buildings being manufactured. There is a very broad range of how you might do that, through using flatpack panellised structural systems, parts of the insides of buildings being manufactured, whether that is bathrooms, kitchens, utility cupboards, parts of plant rooms and rises. It also includes more modern and future-looking techniques, such as 3D printing, which some of you will be aware of—it is coming; it has not really landed in our industry yet, but it is probably coming in some shape or form—through to things that are not about off-site manufacturing but more about how we do things better on site, including digital construction techniques and the advent of technology being applied on construction sites.

That seven-category MMC definition is being formally launched by the Ministry to be used in different approaches, including potentially procurement, and to drive consistency of language in the industry.

Dr Goodier: I agree with that. The term “MMC” has been around 15 years or so. It was John Prescott who first used the term. On the one hand, we have to be very careful in using “modern” as a term—15 years ago to today: is it still modern? As Mark said, it is the latest developments in construction. We also need to take care because it is quite a UK-centric term. Other countries around the world do not really call it MMC. They have a variety of different terms around the world, and although a lot of them overlap, they are different.

Victoria Pinoncelly: I agree with what has been said. It is true that there is a range of terminology used. For instance, the Greater London Authority tends to refer to precision manufactured housing, which gives that idea of technological advancement.

Q3 **Chair:** Are there any figures about how many properties are being built with each of these different types of MMC? That is one of the things we struggle with, to find out how many properties are being built by these methods.

Mark Farmer: The simple answer to that is no, not in terms of reliable figures. There are estimates and guesstimates circulating around the industry at the moment in terms of what proportion of our total new build output is delivered in a modern or MMC-led way, taking Chris’s point about what “modern” really is. It is clear to me that starting with a definition is part of what we need to do to capture data. One of the ideas behind having a formal definition is that we start to capture data as part of new build output. What proportion is being delivered across those seven categories, ranging from full volumetric modular manufactured, through to digital technologies and hybrid construction? There is a big chunk in between where homes are being built proportionally, part traditionally and part using off-site content. That middle ground spans a



large chunk—a larger bit than we think is already happening in our industry. It is not as simple as saying there is traditional construction and MMC construction. There is a big overlap in between.

Dr Goodier: Part of the difficulty is the sheer size and the variability of the construction sector. It is massive. The vast majority of construction companies are small SMEs with fewer than 10 people and very local jobbing builders, who do housing extensions or small one-off properties. They are disengaged from the national agenda. Getting them to engage and trying to understand what they do is very hard.

We tried to measure the off-site sector, as we called it then, about 10 years ago. We did some research in what you could call a top-down study from the available data. We found about 5% to 7% that we would call off-site about 10 years ago. Now I would guesstimate, and agree with Mark, that it is more 10% to 20%, depending on what you said was in and out and depending where you are. For example, there is a great deal of timber frame housing in Scotland and not very much in England. If we take a UK picture or a Scotland and England view, it could be quite different just on timber frame.

Victoria Pinoncelly: I agree that it is not perfect because off-site construction does not include, for instance, having some element of modular or on-site innovation. In 2013 the UK Commission for Education and Skills found that 7% of the UK's construction output was off-site construction, but it is not an ideal figure.

Q4 **Chair:** You mentioned how “modern” 15 years ago might be different from “modern” today, and it might be different in 15 years’ time. You mentioned 3D printing. The idea of printing a house seems almost like science fiction. Is it going to happen?

Mark Farmer: If you look at where technology is taking the world of what is known as additive manufacturing, which 3D printing is formally known as, there are examples internationally where entire homes have been 3D printed using concrete and a cementitious mix out of a nozzle. You basically go around on a digital coded design and you can print a home. The reality is, if you want my personal opinion, that it is unlikely we are going enter into a world where entire homes are 3D printed. What we are going to see is 3D printing used at a component level, with the idea of using small-scale 3D printers for maybe bespoke parts of buildings, which, rather than being stock standard sections or component types, can be printed bespoke without there being a premium to cost. You will see a world where parts of buildings are 3D printed but the bulk of what we are talking about, certainly in terms of structures, will be either site or off-site manufactured in a more traditional sense.

Dr Goodier: I agree with Mark. We have been researching 3D printing at Loughborough for probably 15 years now. We are probably the leading university doing 3D cementitious printing. As Mark said, it is for higher value components. The problem is that you can go on the internet and



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find nice YouTube videos that claim, "I printed a house in my garden in China," but is it to full building regs and code, and structurally and thermally efficient? No, it is not, but they printed it. In a way, it is a long way from competing with normal or even MMC construction methods but it does make good press, so you do see it in the press a lot.

Q5 Matt Western: What do you think are the primary benefits of these types of manufacturing of new homes?

Victoria Pinoncelly: The key benefits, if we are to summarise four main elements in our research, are the speed of construction, the cost of construction being lower, the fact that it can be better quality output and that it is more sustainable. That said, sometimes, at least from a researcher perspective, there is some evidence that is lacking in terms of studies done in a comprehensive way because of the fact that MMC take-up in the UK is not very high.

For instance with speed, once you obtain planning permission it takes two-thirds of the time compared with a traditional scheme. That is a conservative estimate. With the cost, the Homes and Communities Agency—when it was called that—report found that it was 10% cheaper. It could potentially be more than that, depending on the technique you use. In terms of the quality, the other panellists will be able to go into more detail than I can, but if you build in a factory there is more oversight and more controls, and you get better reliability with components. We should not forget that with our current construction model, there are a lot of issues with quality. In terms of sustainability, you can reduce waste in situ when you manufacture components. There is also less traffic around construction sites and there can be some benefits in terms of having less disruption to local communities, to summarise quickly.

Mark Farmer: I agree with Victoria's points on cost, time and quality benefits. My only caveat would be that it has to be done well. There is a chance—and we are perhaps starting to see signs of it as the off-site and MMC market evolves in the UK—that you can have poor-quality MMC as much as you can have poor-quality traditional buildings. Those on-paper benefits do accrue if you set your businesses up correctly and if you harness technology in the right way. A lot of the existing off-site sector in the UK is very much building traditionally; it just happens to be under cover in a shed or factory.

What the future looks like and where the scalability really comes in in terms of benefits is in the ability to build production capacity in the UK homebuilding sector. That is one of the benefits of off-site and modern methods of construction, which links to some of the things that I said when I gave evidence to this Committee two years ago in your capacity inquiry. At the moment, we are struggling, as Victoria said, to deliver quantity and quality side by side. As quantity increases, quality diminishes. We need new techniques but we need to have approaches that are technology-enabled and that make the most of how we use



digital in particular not to only design but then to manufacture, to create scalability.

If we do that well, we can have additionality of capacity to build 300,000 homes or whatever it might be. At the moment, I do not see that happening through traditional techniques unless you have quality that is suffering or you have big build cost inflation. We have both of those and have had both of those issues in recent years.

Q6 Matt Western: What should we be learning from countries like the US, which is pretty big on this, in my understanding? I have seen it there in situ, but it is also in Germany and Scandinavia.

Mark Farmer: From an international perspective, I would not say there is any one standout country that creates an exemplar that we should follow. They all have their own approaches. The US is quite varied. What happens on the west coast in California is very different from what you see in Florida or even in New York.

The approach towards manufacturing in the US tends to be one that builds on the fact that they use timber quite a lot. They use stick-based construction technology and they are starting to use digital manufacturing to influence that. There are certain production platforms that are setting up as we speak that use timber but digital manufacturing. That includes two of the major technology companies that are entering this space, Google and Amazon. They have both acquired off-site manufacturing businesses in the last 12 to 18 months to deliver prefabricated homes, as a bit of a Trojan horse towards embedding technology into homes going forward.

Germany has a very well developed single family housing off-site market, such as Huf Haus, with some of these premium products, but they have not managed to move that into what I would call high-density construction. Apartments in Germany are built in much the same way as we build here traditionally.

Dr Goodier: We can learn from international examples but we have to be very careful in taking approaches from abroad. The UK history of construction and its current building environment is quite unique amongst the world. We have the oldest built environment so the rate of change is one of the smallest, and hence, in terms of our history, our culture and the way we think about the built environment and homes especially, we are quite wedded to our thatched cottages, man in his castle and this type of thing. Other countries, like the US and Australia, do not have that as much.

Then there is the value of land in our congested island. America is a good example but you have places like New York—extremely congested—and then places like Utah and the plains, where land is extremely cheap. It is the same in Australia. Europe has the closest examples. There may be good examples. Scandinavia is a good example, but think about their



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climate; in the winter, in the northern part, it is dark 24 hours a day and there are sub-zero temperatures of minus 10° or minus 20° for weeks and months. That lends itself very much to the off-site advantages we were discussing earlier, in terms of speed to build, quality and things like that.

The other thing is in homes especially. My wife is from Bilbao in Spain, and the way they are delivering in Spain and in a lot of the middle European countries like Germany, is through high-rises with five to eight storeys but with very similar architecture. That lends itself more to flat panel modular than our more mixed style of planning and housing here.

We have to be quite careful with how we take approaches, as well as with the way we build, in terms of trades and craftsmen and the construction sector. As I mentioned at the start, the bulk of the sector is small SMEs with fewer than 10 people, and even our biggest construction companies are quite small compared to French, German and some of the other ones. They are much more vertically integrated across there than we are here. We can take examples, but be careful.

Q7 **Matt Western:** We have heard about some of the advantages in quality, speed and whatever. There is variable quality, as I think was said earlier, but there are some advantages. Is there a question of durability with this?

Dr Goodier: There is a question because, on the one hand, there are not many of the latest systems that have been around for 50 or 100 years. My house was built in 1937; it is still here, just about. The flipside is that, with a lot of the post-war housing, a problem MMC and off-site has is that there was a rush for post-war housing that was only designed to last 10 years or so. A lot of it far outlasted its design life, which should be a good thing, but then they look quite bad and a lot of the public have a poor perception. What is needed is some good durability, lifecycle, long-term data, especially for insurers and warrantors to guarantee to invest or investors to invest in a factory. It is needed, yes.

Q8 **Mr Dhesi:** Having worked in the construction industry for well over a decade, today's Select Committee session on modern methods of construction is of particular personal interest to me. Let us delve into Government targets and commitments. In their 2017 manifesto, the Government pledged to meet the 2015 Government's target to build 1 million additional homes by 2020. In your opinion, can using MMC help the Government meet their homebuilding targets, given they are currently failing to do so?

Mark Farmer: Yes. It is vital. For the reasons I set out slightly earlier, the existing traditional homebuilding industry is not sized to deliver that kind of quantum of output. Last year, there were over 220,000 units of total net additions, of which there were about 190,000 new builds going into supply. What we have seen increasingly over the recent three or four-year period as we have increased production is that the industry has



suffered stress that has manifested itself in poor-quality build and in reputational issues for some of the volume housebuilders.

The need to diversify the production process is as important in solving the housing crisis as some of the more well-publicised issues like land availability, planning systems and affordability. They are all part of a very complex jigsaw. My view is that modernising the basic design and production process is critical. From a policy perspective, there are still some important levers that have not yet been pulled. There is good work that has been in relation to things like Homes England starting to recognise the role of MMC as part of its public land disposal programme.

That recognition needs to go through the gears a bit. We need to get more muscular in terms of how we drive the homebuilding sector towards a greater uptake of MMC and more modern approaches to delivery. It has to be a balance between demand stimulation—i.e. mandating it on public land, and there is significant public land coming through—and also supporting the building of capacity. What you do not want to do is drive the market in a certain direction and find you have no capacity to deliver good-quality MMC. There is a real balance there.

One thing in terms of the private sector and a policy tool—and it may be slightly controversial but it is relevant and contextual in the last few days, given some of the headlines that have abounded around Help to Buy—is that at the moment the Help to Buy policy is being used in a fairly indiscriminate and some might say a slightly unintelligent way, in that the way in which housebuilders are accessing Help to Buy does not have any conditionality linked to modernising their delivery model and creating high-quality homes.

Q9 Mr Dhesi: I assume everybody is in agreement that MMC would help the Government to meet their targets.

Dr Goodier: Partly.

Victoria Pinoncelly: Partly.

Dr Goodier: MMC is vital and needed but the target and the challenge is so great that you need all forms of construction. In terms of the SMEs, the small people companies, self-build and the smaller ones, bringing those on the journey is essential. We need all the help we can get. My personal view that we will never meet that 1 million goal; we will be chasing our tail, but we need to try because it is so important.

Victoria Pinoncelly: There is something else that is important. Of course I agree with what Mark has said around industry capacity, but we also need to think about the diversification of providers because of the speed advantages of MMC that I have talked about. I am assuming you are all familiar with the build-out review that Oliver Letwin published last year. It is not in private developers' interests to release their products into the market too quickly because otherwise their sale prices will not be



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maintained. In terms of the speed advantages of MMC, they particularly apply to self-build SME developers, council-led housing companies and housing associations but we need to also consider the land assembly challenges and the planning and development challenges.

- Q10 **Mr Dhesi:** Dr Goodier, you mentioned the scale of the challenge. Shelter's commission on social housing recommended that 150,000 new social homes are built each year in order to deliver the 3.1 million homes over the next 20 years. Homes England itself is creating strategic partnerships with housing associations. Do you think the use of MMC can help local authorities and Homes England deliver those social and affordable homes targets?

Dr Goodier: Very much so. We should be looking to them to take the lead as exemplars and have the economies of scale to drive through some change and guarantee capacity, so that the sector can invest in infrastructure, as in factories, to get those numbers.

Another bit of the equation that has been alluded to is that the technical cost of building a home is only about a quarter of the sale price. However good we are at MMC, it is still about getting better at this 25%, with the rest being the land value profit, as Mark was alluding to, and sales, infrastructure and other things on the side. It is one of a number of policy levers that need to be looked into to help us get this target.

I see that in housing associations and local authorities, affordable housing has taken the lead because they have economies of scale. Also, crucially, they have an investment in the future of that property. They are not like developers, who are building it and leaving it. They are building it and they have an interest in maintaining quality and performance in that building over its life, which MMC and off-site can help guarantee.

- Q11 **Mr Dhesi:** Ms Pinoncelly, C4Plus Ltd said that MMC will not be suitable for high-end bespoke building, but do you think that this is merely a solution in terms of MMC for the private rented and social sector, or do you think it can be successful in the private ownership realm as well?

Victoria Pinoncelly: In the report it was more London-focused, but I am sure it is true of the rest of the UK. Sometimes when people think about MMC within the residential sector, they think about student accommodation or build-to-rent. Even though these forms of development have affinities with MMC because you want your rental income to come quicker, there are examples of private for sale MMC developments in London already. Of course, housing associations and the in the public sector councils are starting to become more involved in development pretty recently. They are showing great interest in the adoption of MMC.

I agree with Chris's point—and this is one of the recommendations that we make in the report—that one of the issues in the MMC sector is that some manufacturers do not have enough demand to maintain the



capacity of a factory. We say that councils and housing associations should find a way to pool demand for MMC to sustain factory production. Indeed, this is already taking place. For temporary accommodation in London, there has been a vehicle that has been put into place that is backed by the GLA, London Councils and 18 London boroughs, which is commissioning MMC houses together to meet the need for temporary accommodation. We call for this to be extended for permanent accommodation.

Q12 Mr Dhesi: Mr Farmer, the construction sector deal that the Government published last July set out their own hopes and aspirations for “better-performing buildings that are built more quickly and at a lower cost”, with “lower energy use and cheaper bills”. Do you think that MMC can help the Government to achieve those ambitions?

Mark Farmer: Absolutely, from a homebuilding perspective but also in wider social infrastructure. Part of the Government’s presumption in favour of MMC for their own direct spend programme on schools, hospitals, prisons and defence and transportation assets is predicated on the use of MMC. The three central themes of a construction sector deal are about promoting digital manufacturing and building performance to drive the aims that you have set out. From a homebuilding perspective, modern methods of construction, if it is done well and going back to the point I made earlier, should be all about digital, technology-led manufacturing, which drives process that takes construction closer to what you would ordinarily expect in the automotive and aerospace sector. It will never be the same, and there are lots of reasons I will not go into now as to why that is the case. We need to move to more of a high productivity, process-led industry that is using technology in the right way. Ultimately, if we do not do that, we will not achieve the construction sector deal ambitions. It is massively important that the funding that is going into is deployed in the right way to achieve those aims.

Q13 Andrew Lewer: I have been ticking and crossing a few bits off in the course of the previous questions, deciding what I was going to ask. I think I have already heard you talk about the international sector and why it is that some countries have done slightly more than others, although it is very mixed. I think I have also heard you all say that more MMC is needed. I wanted to talk about the acceleration of the construction programme and allocating surplus land in that regard. On top of the provision of the actual land, do you think that local authorities should be rethinking planning regulations to make them more sympathetic to homes that use MMC methods?

Victoria Pinoncelly: It is a very good question. Sometimes local planning requirements—for instance, the need to employ a local workforce—can be seen as an obstacle to the take-up of MMC, although I do not think planning is the main obstacle to MMC coming forward more broadly, because schemes are considered on a wider basis. The construction method is not a material consideration in planning terms. However, it is true that the local authority could probably make their support of MMC a



bit clearer and say something around supporting MMC to speed up housing delivery in their local plans, in broader planning terms.

Mark Farmer: I am a little bit nervous about going down the route of planning playing a role in promoting and pump-priming MMC, because it implies that buildings that are delivered through MMC need special treatment in terms of what they look like and the visual impact of buildings. MMC done well should be agnostic, so you cannot tell how buildings have been built. There are a few examples out there where looking modular is celebrated by developers and they are promoting that. That works in some instances, but if we are creating cookie-cutter repetitive architecture where you can tell the building is modular because of the architecture, then something has gone wrong. The planning system needs to be an arbiter across all sorts of construction, whether traditional or off-site manufactured.

There are, as Victoria said, some potential barriers around local employment that could be dealt with through different types of section 106 agreement. In London, there is a grown-up discussion going on with the Mayor about how precision manufactured homes could be promoted in London whilst squaring the circle in terms of the fact some of the employment is being displaced to remote locations. Many of the homes that might be built in London as modular homes, or off-site manufactured homes, may well be manufactured in the midlands or the north. That has a local employment impact. There needs to be a grown-up discussion about that in terms of rebalancing the economy as part of the industrial strategy in the UK.

I also see the beginnings of an opportunity. As we move to digital manufacturing, you will gradually see, over the next decade, the advent of smaller-scale, more flexible site-based manufacturing, where the point of production is not a factory 200 miles away. You will see more and more manufactured content being delivered either at the site or near the site, in what I would term flying factories, where smaller-scale digital manufacturing enables parts of buildings to be put together with a local workforce using manufacturing techniques. We are not there yet but it is coming.

Dr Goodier: There are a few interesting points there that both my colleagues have touched on. In regards to local planning and off-site modular MMC, it is a poor excuse to blame poor design on modular or off-site. There are plenty of traditional buildings that are badly designed and terribly planned. It is not just because they are MMC or whatever. You can have poor design for MMC or traditional.

Where we start any kind of encouragement or mandating, we have to be very careful about being anti-competitive. You would have the traditional builders saying, "I am not allowed to tender." Going back to my other point, we need everybody if we are going to reach these targets. The difficulty with MMC is often with capacity and the size of the company.



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Something local authorities and the Government can do is encourage smaller companies to collaborate to compete. How do they access either larger finance or bigger manufacturing facilities so they can compete with some of the bigger people? Some financial security schemes to bring these smaller people together so they can collaborate with bigger ones would help.

Andrew Lewer: You have already touched on something I was going to follow up with, which was about the dangers of mandating percentages of MMC, picking winners and so on. If we are as confident as we say about the future of this, that should come of its own accord. There seems a slight potential conflict in what we have heard about wanting to share the proceeds of growth and disperse to the midlands and the north but local policies saying, "No, we have come up with a way of keeping it all here as well," which may come into conflict.

More widely, on the basis of this discussion, the evidence and what we are hearing more generally, do you each individually feel that we are reaching or are at some sort of tipping point with MMC, where rather than being an interesting thing on the fringe people have talked about for a long time, it is going to take off and become almost an equal amount of provision to more traditional methods?

Dr Goodier: We are reaching a tipping point. The driver, the need, has been greater than it ever has been. We have been in a similar situation before at various times through the cycles of the construction process. The one guarantee about housebuilding is that it goes up and down in cycles. When we start going up, we all start talking about capacity and how we build them all. When it goes down, lots of people leave the sector. The difference nowadays is the tools available to us—the technology-driven tools, from BIM, DfMA, construction materials, the advances in manufacturing plants and even business models financing how we are more interconnected. The tools we have to apply to these problems are different from 10 or 15 years ago when we were talking about it last. We have a better chance, but for the reasons we have talked about today, it still needs help to get it right.

Mark Farmer: The difference between where we have been in the past and where we are now is we do have a deep problem with skills. It is a structural decline in skills. It is not a cyclical thing. We always struggle as an industry to get skills in to our industry, but we are now in a period of time where we have an ageing workforce, we have more people retiring every year than are coming in and we have a problem attracting young talent, which is a whole different discussion about image in education, which no doubt we will touch on. What will force the tipping point, though we are not quite there yet, is that one of the most impressive off-site manufacturing setups I have seen in the last few years is being set up by a volume housebuilder, which I would not have thought I would have heard myself saying six or 12 months ago. That is the factory being built on the Thames Estuary at the moment by Berkeley.



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Berkeley is a large London and south-east-based housebuilder, about the fifth biggest in the UK. What it has recognised—and the reason it is pursuing an MMC strategy in its core delivery and is sizing its factory to deliver 25% of the entire output from a factory—is skills and quality. It is not speed. As we have already heard, it does not necessarily need units that quickly because it has a velocity of how quickly they can sell units. What Tony Pidgley and the rest of the management team at Berkeley realise is the risks that they have to their reputation around building traditionally now are so great that they are being forced to consider different means of production that give more certainty. Moving production into a factory gives a certainty, combined with a digital manufacturing platform, which is what they are doing, and gives versatility to go from two to 20 storeys, to address it architecturally in a variety of different ways. When something like that happens, you start to think, “Okay, the tipping point is coming.” I think we are in that zone.

Victoria Pinoncelly: There is a tipping point. Much of it has been said but, yes, there is an ageing workforce. In London, 33% of the construction workforce is from the EU, with 10% in the rest of the UK, which is not negligible. There is lack of take-up of apprenticeships and an ageing workforce. Berkeley is a great example in terms of developers. It understands that MMC is an imperative. It is not even about increasing housing delivery; it is about sustaining the current levels of housing delivery in the future.

Q14 **Mary Robinson:** Moving seamlessly on, because we have begun the discussion about skills and the challenges around recruitment and skills in the construction sector, there is a consensus that the workforce will need to develop new skills if the industry is going to embrace MMC to a greater extent. There is a debate surrounding how training could be organised. How could this training be delivered and who should be responsible for designing, delivering and financing this training? You have alluded to it being more in-house but is that the whole answer?

Mark Farmer: The whole training and skills piece is a critically important element of this. We talk about digital manufacturing but we need people to make all of this come to life; we need people armed with different skills from what we are currently using in the industry. That is a combination. It is not just about whether we need a bricklayer or an assembly technician. It is about new skills in design, new skills in urban planning and new skills in building and land economy. It is a whole raft of different skills.

To be quite frank, of all of the things I have looked at in my travels across the industry, it is one of the most difficult parts to understand how we address, because there are certain institutional barriers as to how the educational system is currently set up, from a DfE perspective but also into adult education. There are also barriers linked to the CITB, the Construction Industry Training Board, which has gone through a big reform process but is still inhibited in playing a part in driving the skills



agenda, because its statutory mandate is more about on-site skills. As soon as you start talking about off-site skills and digital design, it does not sit in its mandate.

We have a gap in terms of the institutional framework to drive skills, which is leading to manufacturers setting businesses up and doing their own DIY training. That is not scalable because you then have repetition of process and all sorts of different skills being trained as one-off processes. Part of the reason I am a trustee of MOBIE—those of you who know George Clarke will know that he is passionate about wanting to modernise the industry—is to try to reimagine the industry to get kids more interested in it from a very early stage. That is from key stage 1 onwards, going into schools and talking about a new way of building homes, which we can then support through a new way of training, ranging from level 3, 4 and 5, HNC and HND courses to degree apprenticeships and MSC courses, all of them based on vocational and applied learning but using the home, if you like, as the leverage point for training.

My fear at the moment is that many of the systems we have in place are broken and do not enable us to do that. Something like MOBIE is there because we are trying to fill a gap, and that should not necessarily be the case. We need to have a strategic approach to education that is linked to reimagining the industry, which is linked to attraction and to getting kids into our industry in a way that allows us to frame it as a high-tech, clean-tech, sustainable and high-productivity industry. At the moment we are a million miles away from that; we need to work hard on that.

Dr Goodier: I totally agree with Mark. One of the biggest crises of not just the construction industry but wider engineering as well is attracting talented people to the sector. I am a civil engineer and we have been talking for decades about attracting the best people, whether it is diversity, talented people or whatever. Mark mentioned key stage 1. My daughter is five; she is at primary school and already you can see it being set at an early age what kind of careers they are attracted to. My daughter wants to be a hairdresser; she is five. Does she want to be a civil engineer? Dad is a civil engineer. No, she does not. It is embedded from those early years. There is no easy way to change that. It is a cultural thing. It is a national thing but we need to try, for the sake of construction, homebuilding and engineering, to increase the diversity.

Universities are a part of the problem. We could do better with diversity and more modern ways of building. Especially in the trade sector, in terms of how we pass on tacit knowledge through the generations, through the trade, it is almost learning on the job. It is an “I will teach you all the tricks of the trade” kind of thing, and those poor practices get passed on through the generations. There needs to be almost a root-and-branch review of the way we train.



I will mention a couple of examples. We mentioned Germany before. They have something called a master craftsman, the Meister, which is very highly regarded and very well paid. They are the leading craftsman in their profession. Some countries protect titles like engineer. That is something we could look at, as well as similar things to raise the reputation and draw people into these industries for the future.

Victoria Pinoncelly: MMC could definitely be an opportunity to make the construction sector a bit more diverse. Currently, women make up only 11% of the construction workforce. Working on-site is tough physically but there are all kinds of new jobs, not just working in the factories. There is an opportunity in there.

Q15 **Mary Robinson:** The research by the CITB shows that many apprentices in construction leave the sector because they are concerned about low pay and a lack of career progression. Diversity would also be part of that. Would a shift towards MMC change this? It is not just about attracting people to it but retaining them. Would that help?

Mark Farmer: I think so. You are creating the opportunity for a new set of career pathways. You are merging the world of design, manufacturing, and construction assembly. You are reframing it with technology at its heart. One of the big things that is going to draw kids into our industry is technology. Analogue will always be part of our industry in some shape or form, but we have to have a greater technology bias towards what we do. Ultimately, taking some of the physicality out of construction will assist some of the more manual trades, where you see people working in bricklaying or concrete who have to retire at 50 years old because their health is such that they are suffering in doing some of the physical elements of work. You would have not only an attraction benefit but a longevity benefit, in terms of people working longer and having more options as to where they might deviate between working in factories and working on sites.

Q16 **Mary Robinson:** It sounds like the CITB perhaps needs to look again at its mandate and the way it does things. Does it also need to look at where its training centres are based? I am not sure whether there are any in the north that are not specific for various industries. Do we need to look at the whole of the industry and the way we train?

Mark Farmer: The CITB has a key role as an industry representative body. It is funded by industry. That is a really important part. The levy piece and the statutory mandate is outwith the CITB's control. That would need some Government intervention, or industry agreeing that it is going to deviate from this mandate.

From a training centre perspective, we suffer. There is no real centre of excellence when it comes to off-site manufacturing training and digital construction. There is the beginnings of a network of HE/FE institutions that are becoming known for it, but it needs more glue to bring it together into a framework so that centres of excellence can be



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established that enable manufacturers, designers and assembly contracting businesses to benefit from centralised training, rather than everyone doing their own version of the same thing, which is what is happening at the moment.

Q17 Mary Robinson: Is this a way to bring the work of the colleges together under a different umbrella?

Dr Goodier: I think so. I see it is as almost like regional networks, because construction is a fairly regional industry and profession. The leading employers in a region, as well as the universities, colleges and schools, highlighting best practice, swapping expertise and teaching inspiration would be very beneficial. We have such fantastic projects to inspire younger people and we do not use them enough.

Q18 Mary Robinson: Would all of these changes change the way we develop MMC infrastructure to benefit the domestic workforce? Is it something that would get more young people involved?

Dr Goodier: I think so, especially through the digital approach. Rather than losing some of our young people, including graduates, to aerospace and other sectors, we can offer them an exciting pathway in the sector. As Mark said, it is also about putting together the homes. People are put off. I did three or four years on a construction site and that was enough for me. It is hard. I worked through three British winters. It is a hard profession. We could make it more attractive. Victoria mentioned diversity. There is still a very small proportion of women on construction sites. Imagine if it was 50% women on construction sites. How would that improve the whole sector?

Q19 Mary Robinson: Is that achievable?

Dr Goodier: It is inspirational.

Q20 Chair: To pick up on the idea of training centres, I do not know whether you are aware of the engineering apprentice training centre in Sheffield linked to the Advanced Manufacturing Research Centre, where you have links to large and small employers, to the University of Sheffield and to research as well. Is that the sort of model that you can start to develop in the construction industry? Is that the way forward?

Mark Farmer: Absolutely. I was at that facility last week. The AMRC training centre in Sheffield is a really good exemplar of how academia and industry can come together. You have a vocationally led approach. In that instance, it is highly biased towards aerospace and automotive, because that is what AMRC is promoting, but they are already looking at construction. There is some great stuff happening at AMRC. Dudley College is doing something similar in the West Midlands. You are starting to see the beginnings of an infrastructure that can really promote advanced construction and manufacture-led construction.

Q21 Matt Western: Dr Goodier, you mentioned in passing some of the



challenges facing the SME sector in adopting MMC-type methods. How do you think we can encourage them to play a much bigger role in developing this sector?

Dr Goodier: That is a great question. It is very important that we do that. As I mentioned, they are the bulk of the sector by turnover, by employees. They are, in the main, disengaged from a lot of the national agendas. I had a housing extension in my house and that gave me quite an insight into their remit. They have regular business. They do quite well. They are quite happy. How do we bring them along on the journey? It goes back to my earlier point; it is about getting them early. Get them at schools and colleges, where they are not taught bricklaying first but they are taught MMC. There are a variety of technological ways of putting a home together: bricks are one; timber frame is another. We can lead from the front there.

There is no quick policy lever to pull. It will take a generation to change. If we look forward 10 or 20 years, it will be when that next generation come through and demand change. We see it in some of the young students at university. There is a similar process that they went through with sustainability. Fifteen years ago, 18-year-old students did not talk about it. Now 18-year-olds come in and demand sustainability and ask, "What are you going to teach me on this?" Young people today are often leading the older generation on things like sustainability. It is going to take a generation to instil in the trades doing things differently. When they go and work for these SMEs, they will be saying, "I do things differently. This is what I want to do. I demand high quality. What is your BIM model? What is your digital manufacturing policy?" It will take a generation.

Q22 Matt Western: Is finance an issue, particularly in terms of these smaller builders getting access to funding?

Dr Goodier: Finance is always an issue for everybody. I mentioned before that we need to encourage or help them to collaborate to compete. They do not have the economies of scale or the capacity to invest in the factories, even if they are interested in wanting to. It comes back to talking about local authorities encouraging MMC and off-site. The local authorities have a role to encourage SME builders to come together, maybe help them tender for the bigger contracts and help them partner with regional manufacturing facilities.

We have not yet mentioned platform design that the IPA has been looking at. Similar to the digital agenda, imagine platform designs that all the builders could build to or the manufacturers could supply to. Maybe it is even technology or material agnostic, so timber, steel, concrete and masonry could almost supply to the same designs. That opens up the supply chain. Some small builders could come together and bid for bigger schemes. We need to help embed that framework in local authorities and nationally, and then teach, educate and help the smaller people along on that journey. With many landmark schemes, there will be some trip-ups



over the way. Some might go wrong. We need to help them when they fall over but help the ones that want to try, and then showcase the good ones and help the ones who tripped up on the way.

Victoria Pinoncelly: One thing to consider is that within SME developers, you have small and medium ones. The issue is particularly for medium developers who want to do more housing construction but MMC tends to higher upfront costs compared to traditional construction. That can be an issue, particularly for these kinds of SME developers who cannot operate on balance sheet. The Government have a homebuilding fund, which is £4.6 billion, which is looking to help SME developers to pay for this cost. There is still a range of obstacles for SME developers. Again, there are bigger things—for instance getting access to land, the cost of land values and planning and development. They have some specific challenges.

Mark Farmer: To conclude, there are some really interesting opportunities around where the world of MMC and SMEs come together. A lot of people at the moment think they are mutually exclusive and that high entry costs or big investment being required means that it is precluding SMEs. I see opportunities where the MMC model can work for SMEs, particularly in the world of custom build or supporting self-builders at a smaller level or plot level.

You also have to think about the opportunity if there are big industrialised platforms building things in factories. There is a massive distributed supply chain opportunity for assembly teams. Builders that are currently maybe building traditionally in locations can become part of distributed supply chains through large, centralised production platforms that want to use local builders but more in an assembly context, rather than in a bricklaying context. They still need local people. You can license training. I already see some of the big manufacturing platforms starting to do that by engaging with SMEs. There is an opportunity. Most of it is a mindset issue, if I am really honest, in terms of wanting to engage.

Q23 **Kevin Hollinrake:** I want to turn, if I can, to quality assurance. Mr Farmer, you are on the MHCLG working group on assurance, insurance and finance. Do you want to update us on the workings of that group and what you have found so far?

Mark Farmer: The group was set up in January 2018. It was pursuant to one of the housing White Paper commitments from Government to try to open up the use of MMC when it comes to mortgage finance availability and building insurance policies, in particular. They are two critical things; if you do not resolve those, the MMC expansion will hit the buffers.

This group has been sitting for over 12 months. It is a hugely complex area. There are 30-plus people that sit on the group representing all different parts of the industry stakeholder map. What has become clear is that the critical element of building confidence in mortgage finance underwriting, and in building insurance underwriting as well, has been the mortgage companies and building insurers feeling comfortable with



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longevity. We have already touched upon that in terms of wanting to know the products that being delivered are going to stand the test of time.

Q24 **Kevin Hollinrake:** Did you say they were comfortable or they need to be?

Mark Farmer: They need to be comfortable. At the moment, there is a variable degree of comfort, which is part of the problem we are trying to resolve. You can get a mortgage on off-site manufactured homes. There are lots of good examples of buildings that have been built in factories, which are being lived in, are mortgaged and there are no problems at all. What we need to do is massively make that mainstream as opposed to at the margins of our industry.

What the mortgage companies and the building insurers are effectively saying is about the proxy for understanding quality and understanding the assurance in terms of how well built these homes are and how long they are going to stand the test of time, and also a particular concern of the insurers about disproportionate damage in the event of a fire or flood; there are two slightly different things going on. The proxy for resolving that needs to be resolved by industry, as opposed to external intervention. It needs to involve the warranty companies that are a big part of the new build market. That market is fragmented.

One of the first things I have endeavoured to do on my working group is to bring collaboration among all of the major new build warranty providers in the UK, which we have done. We are significantly progressed on a proposition that is going to effectively create what we are calling an MMC scheme. That MMC scheme will be an umbrella that sits above the existing accreditation landscape. It is not a new technical standard we are going to bring in. It is gluing together the existing landscape of building control and the different manufacturing bodies, whether it is timber, steel or concrete, that exist. The warranty providers are all going to agree a common set of standards by which they are going to evaluate MMC. The building insurers will contribute to that as well, by asking certain questions that they would expect to have answered by manufacturers in terms of the system and its exposure to disproportionate damage.

As I say, it is quite complex. We are taking legal advice at the moment. MHCLG has instructed legal advice to understand liability and reliance because it is a collaborative platform. We are not there yet but I am hopeful that later this year we will be launching something that will have the banks' support, the building societies' support and the insurers' support. The RICS will be part of this as well. I am hoping it will create a step change in acceptability and confidence in the MMC market.

Q25 **Kevin Hollinrake:** Is that the warranty assessment protocol?

Mark Farmer: Yes.

Q26 **Kevin Hollinrake:** You accept that you are not there yet; is that right?



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The NHBC, for example, told us that they need to see much greater investment in product development to ensure the long-term benefit of MMC to the UK housing stock.

Mark Farmer: Yes, the NHBC is one of six or seven warranty providers that sit on my working group.

Kevin Hollinrake: The biggest one, I guess.

Mark Farmer: It is the biggest one. It is by far the largest provider of warranties in the UK. The concern it has, which quite rightly is one that should be shared by everyone, is about making sure that new manufacturing systems, whether they are whole building systems or parts of buildings—obviously the bigger concern is with whole building systems that are structural and affect the integrity of buildings—are quality led, prototyped and research-and-developed correctly, in the right instance. What we need is a balance. We do not want to create a barrier to entry, we do not want to stifle innovation but we need to have quality-led standards. We need a hurdle, so we expect everyone to be able to achieve a common set of minimum standards, which all warranty businesses agree to. Otherwise we stand the risk of poor quality MMC entering the UK market, there being a problem, a systemic problem, a legacy issue, that then sets the entire development of MMC back 20 years. That is the last thing we need at this stage.

Q27 **Kevin Hollinrake:** You can use BOPAS at the moment—the Buildoffsite Property Assurance Scheme

Mark Farmer: You can.

Q28 **Kevin Hollinrake:** Are you saying that that does not go far enough and that we need to go this further step, and that the WAP will do that? Is that what you are saying?

Mark Farmer: What we are trying to do is glue things together. An important distinction is that BOPAS is not a warranty; it is an assurance scheme, so there is no money that sits behind BOPAS. If you have a BOPAS certificate and something goes wrong with your scheme, you cannot sue anyone; you cannot claim money on it. A warranty has insurance sitting behind it or is self-insured. What the mortgage companies are trying to push is that, while great work has been done by BOPAS in setting a standard, we need to build on that and to unify how technical assurance is viewed by the whole market and not just one bit of it. That has to include collaboration amongst the warranty providers.

Q29 **Kevin Hollinrake:** Do you think this warranty assessment protocol will do that and that people like the NHBC will come on board?

Mark Farmer: If we can get there—and the NHBC is a constituent part of that at the moment—if we can get agreement on the technical standards, and if we can get agreement on the legal agreement, which is being drafted as we speak, then we should have something that binds the industry together cohesively, which is what we have been missing. It has



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parallels with the ombudsman debate that is going on as well around how we get cohesion there as well.

Q30 Kevin Hollinrake: You mentioned mortgages before. You can get mortgages. What percentage of mainstream lenders will offer mortgages on MMC?

Mark Farmer: Most of them do.

Q31 Kevin Hollinrake: So what is the problem? Why do you need this?

Mark Farmer: Because it is about scale. There is an erratic approach to how they are underwriting at a local level. There is no central diktat that you will allow lending on this particular type of scheme or this particular type of MMC. It is driven primarily by lenders and their valuers, who sit on local panels, forming views. What you find is that, across the country, most lenders somewhere are lending on MMC but not across the board.

Q32 Kevin Hollinrake: Even without a warranty scheme.

Mark Farmer: No, you have to have a warranty scheme. Part of the problem, and what the mortgage market has recognised, is that some warranty providers are asking for certain things; others are asking for different things. That has created a little bit of uncertainty as to what we should be asking for that protects our security of lending. This is about creating a level playing field: still enabling the warranty providers to compete—they compete based on their brand strength, their market share, their customer service and the warranty terms—but we need some minimum standards, because some of the smaller lenders, I fear, could be hoodwinked into lending on stuff that is not properly verified. We need to have that sense of comfort that MMC is seen as one version of the truth.

Q33 Kevin Hollinrake: Is there a wholesale, market-wide standard that you are looking for which the warranty providers will sit behind?

Mark Farmer: Yes.

Q34 Kevin Hollinrake: Are properties constructed using MMC more risky?

Mark Farmer: They should not be, if they are done in the right way and accredited in the right way. If it is an MMC-scheme property, hopefully, after we launch later this year, you will have a high level of comfort. If anything, we should be looking at creating an environment such as they have in Germany, where MMC is seen as better.

Q35 Kevin Hollinrake: Does the ABI sit on the working group?

Mark Farmer: It does.

Q36 Kevin Hollinrake: It says that homes built using MMC often incorporate combustible materials, such as wood and polystyrene, and is calling for a total ban on the use of these materials. Do you agree with that?



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Mark Farmer: I do not agree with that but I understand the perspective and I have discussions with ABI and its members—some of the larger members of its insurance community—who, quite rightly, have concerns, particularly post Grenfell, as to what role combustibility plays. The key thing we have here as a challenge is overcoming the proposition of combustible materials—and the Government have obviously already moved towards banning combustible materials—

Kevin Hollinrake: Only on external surfaces.

Mark Farmer: On external surfaces only, over six storeys. What we need to think about more holistically is the manufacturing process by which we put buildings together. If it is done in an assured, technology-led way, the basic way in which buildings are put together and the interface between them can deliver more certainty of outcome. I do, however, understand where the insurers are coming from in terms of wanting to de-risk as far as possible and, in some instances, that may be an aversion to having homes that have combustible materials that are part of them. I get that. At the end of the day, you cannot force the insurance community to underwrite something that they are not prepared to.

Q37 **Kevin Hollinrake:** There are also concerns about things like later modifications of a property, or hidden voids that may offer channels for smoke or toxic gases—all kinds of things that may be more of a concern in MMC construction than in traditional construction. How are you going to deal with all that?

Mark Farmer: That should be dealt with through building control. If building regulations are not picking up those issues around fire transfer, compartmentation and the ability for smoke and fire to travel, then there is something wrong with the building regulations. There is a building regulation consultation going on as we speak, post the Hackitt review.

Q38 **Kevin Hollinrake:** We had building regulations before Grenfell, of course.

Mark Farmer: We have to move to a position where everyone is comfortable around what could be engineered as a composite solution and what is prescriptive. It is not for me to talk about the whole debate about prescription versus engineered solutions but, having been very close to the insurers that you are quoting there over the last 12 months, as well as the warranty companies, who all have stakes in this and have skin in the game in terms of money out on the street, it is really important that we do things responsibly and that we do not kneejerk. If we do want to move to a position of banning certain things in certain scenarios, we do need to reflect on whether there are ways in which we can make that safe again. Manufacturing is one of the ways in which we can deliver high-quality solutions, but I understand that inert materials are probably a starting point for many in that debate.

Q39 **Kevin Hollinrake:** We have seen examples, such as the BS 8414 test, which, for many people, has been discredited as a means to prevent the



spread of fire. The ABI did some research on this and found, in real-world conditions, that it was an entirely different result in what happened. How can this work based upon what must be, in the way this has been developed, a standardised test that will work in real-world conditions?

Mark Farmer: Just to be clear, the MMC scheme will not deliver a standardised test. It is an umbrella scheme that brings together the existing testing environment, which includes what building regulations will require but also what manufacturers will be expected to do through the warranty providers insisting on things like large-scale testing. One of the failures of the testing environment to date has been simulating real-world conditions in large-scale testing environments rather than just parts of a system being looked at in isolation. You will see the warranty providers and insurers dictating the terms by which they want to see testing evidenced, and that has to reflect the real world as much as possible.

It is also worth pointing out that, in the MMC world, the off-site manufacturing world, there is a lot of concern about timber at the moment and combustible materials alongside that. Large chunks of what are delivered through modern methods are using fairly traditional construction materials, including concrete and steel, so there should not be a fixation with the concern about timber, albeit I understand that we should look to engineer solutions that allay concerns. It should be multi-material thinking.

Q40 **Kevin Hollinrake:** I have thrown a lot of questions at you. Are there any other contributions?

Dr Goodier: Just to reinforce a few points, I would probably say I agree with Mark. It is not just the component; testing the system is very important. Combustibility is important but I would say that capacity in fire is the real thing. For example, steelwork is quite poor at temperatures of a typical house fire. It loses most of its capacity at the temperature that you can find in a typical house fire, but it is not combustible. We have to talk about structural capacity in a fire and not just combustibility.

I would also say that a lot of the MMC systems coming on—and Mark knows much more about warranty than me—are very thoroughly tested because they are new. A big problem is in existing building systems, such as with in-situ cavity walls. I would say that the traditional cavity wall that we love in this country is what we call an opportunity for defects. It hides all the bad stuff. I am glad that Mark mentioned building control. In all of this, we need to toughen up building control for traditional in-situ and for MMC to raise the quality and to get it looked at all the time. At the moment, you can build a cavity wall right to the top, almost, before they come and have a look, and you can hide all your little problems in there, including combustible material, gaps in insulation, and performance gaps. A multitude of sins can get hidden in a traditional



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cavity wall compared with a manufactured environment, which is much more open and easier to inspect.

- Q41 **Matt Western:** Just very briefly, Mr Farmer, to come back to you, my understanding is that you are very knowledgeable on other countries and how they go about this sector. I just want to talk about mortgage finance availability and how varied it is across the UK, as you said. In Japan, my understanding is that properties are built for 25-year longevity, which is not that long compared to the UK typically. How do they finance?

Mark Farmer: They have a version of a mortgage product but it is very much predicated on what you have said around the fact that the Japanese housing market views housing as a depreciating asset, like a car. As soon as you buy it, it depreciates in value, whereas the link here in the UK and many other markets is that your home is an appreciating asset.

- Q42 **Matt Western:** It is like a rent, basically.

Mark Farmer: Yes. Effectively, it is a depreciating net-present-value calculation, where the loan that is provided to finance that is secured mostly on the value of the land. It is the plot that has the value in Japan, because of scarcity of plots. In many instances, the use of external finances is limited, because the cost of building homes is a lot less than what it is here in the UK. The land does not necessarily trade but is passed down in families. You stay with one plot and all you are doing is paying X amount of money, as you would for a new car, perhaps. In some instances, the amount of money we are talking about is the same. That is how different it is in Japan compared to the UK. It needs less reliance on external mortgage finance, but they do have loan models that have a different approach around knowing that the security against that loan is depreciating year by year. Effectively, it has a reversionary value.

Dr Goodier: I would reinforce that point, if I may. Mark mentioned appreciation versus depreciation. In this country, it is unrealistic. We expect our house prices to go up forever and to last forever, and that is what we see as unrealistic. Japan is the flipside of that. There, off-site houses are designed to last about 25 to 30 years, whereas ours are maybe mortgaged for 25 years but we expect them to last for 50 to 75. I would also ask, in terms of the Japanese model with regard to sustainability, the circular economy and those types of things whether we really want to replace our houses every 25 years in this country? The answer is no. We do want them to last as long as possible and as long as they are fit for purpose.

- Q43 **Chair:** Could I just ask you about public confidence? I am a lay member of the public and I look at these things. Is a traditionally built house going to last for longer? I can go and look at them. They were built 100 or more years ago, and they are still there. With modern methods of construction, what you have is a piece of paper saying that they should last for another 30, 40 or 50 years hopefully. In my constituency, until a



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few years ago, I could have looked at properties built of 5M and Vic Hallam construction in the 1970s that have all been demolished because of system failures. How do you rebuild confidence?

Mark Farmer: It is about doing it well and everything that we have been talking about in terms of the responsible evolution of a new market. I do not think it should look like what we have seen in the past. Post-war prefabrication is the perception issue that we are battling against. You would be surprised at how little it impacts the general consumer and the public. If you talk to many of the people living in MMC-led delivery, whether here in London or in places like Manchester or Birmingham, where this product exists, is lived in and is mortgaged, they are not influenced by the fact that it is an off-site-built home. They are more influenced by the quality of the space and by the location; it is location, location, location in many instances. They want to know there is durability there but, in most instances, that is driven by the fact that they can bang on the walls and they know it feels solid. There are some quite low-tech elements as to how the consumer-at-large will perceive MMC.

I would not overdo the public perception issue. Most of the perception issue, as I see it at the moment, is from the industry not wanting to change. The end consumer just looks at what some of the poor-quality traditional build has delivered in the last few years and is thinking, "Just give me some choice". MMC is part of that choice, but it has to be done responsibly. That is the overarching theme for me.

Dr Goodier: I would agree with that. If you asked most people in this room what the construction of their walls is at home, they might guess it is brick, a cavity or solid wall, or stone, but they would not know. We also have to be careful. We do not want another Ronan Point or something that could set the whole agenda back by one bad example. We have to be careful—and this is where the warranty comes in—doing it right, doing it properly and gaining the confidence of the industry, and hence the public.

Victoria Pinoncely: Absolutely. The public perception lingers but it lingers maybe more within the industry. There have been other sectors where there have been crises in the past and they have learned from the lessons and moved on. In Sweden, they have had some bad MMC in the past and they still use it quite a lot today.

It is interesting because some modular schemes, just to give anecdotal evidence, within the industry, planning and the built environment, will be put forward, but if you look at the marketing brochure for a scheme, it does not say anywhere that it is modular. As Mark said, people do not notice. We are not yet at the point where it is seen as a strength. One of the things that we are calling for is that we should understand the public perception of modular homes better because sometimes it is used as an excuse that people do not want them, but we do not know whether that is true.

Chair: Thank you all very much for coming to give evidence this

afternoon.

Examination of witnesses

Witnesses: Ben Derbyshire, Ivan Harbour, and Dr Chris Millard.

Q44 **Chair:** Thank you very much for joining us this afternoon. Could I ask you to state your name and the organisation you represent?

Ivan Harbour: I am Ivan Harbour from Rogers Stirk Harbour + Partners. We are architects. I have been involved in MMC in the residential sector for those last 15 years and, more generally as a practice, probably for the last 50 years.

Ben Derbyshire: I am Ben Derbyshire. I am the President of the Royal Institute of British Architects, representing more than 40,000 members in the profession. We are aggregating their response in particular to various consultations on this issue and forwarding them to you. I am also chair of a practice called HTA Design, with 200 or so interdisciplinary professionals, mostly architects. We concentrate on building housing, and our current workload is more than 50% MMC, according to Mark's definition.

Dr Millard: I am Chris Millard. I work for Laing O'Rourke. I am technical director for manufacturing assets. Laing O'Rourke is one of the country's leading current exponents of MMC in off-site construction. I lead the development of our off-site construction toolkit—our kit of parts and the methodologies by which we do that. That is based on experience of 20 years in the car industry, where I used to design new motorcars and run manufacturing plants, and then 15 years in construction, where I have led construction on airports, in industrial and public buildings, and in residential.

Q45 **Chair:** Thank you very much. In terms of each of your businesses, what types of MMC have you been involved with? What decided you to get involved in MMC in those particular ways?

Ivan Harbour: Our practice has been involved in MMC, particularly in the commercial sector, for many years. We would all recognise that most commercial buildings are built with what I would term modern methods of construction.

In the residential sector, we got involved originally with the infamous John Prescott £60,000 house and we built one product there, which was a panellised system. Over the last 15 years, we have been evolving our approach to MMC and are now working very closely—and I have to say this is very much a collaborative process, not architects on their own—in a modular system, of which we have a number of examples. Of course, if any of you would like to visit them, it is probably better to have this



meeting in one of those places to talk about the product, particularly in relation to quality, which was discussed at the end of the last question, to put away the myth or what we think people feel in terms of questions about the image of things that have not been fabricated by builders in a field.

Ben Derbyshire: From our point of view, our experience of housing—and our practice is in its 50th year—has been long and arduous. We have worked in an industry beset by failure. We are enthusiasts for modern methods of construction because there has to be a better way and we have been looking for it. Our shorthand for that better way is to become collaborative designers in industry by means of which there is a much more intimate longitudinal and horizontal relationship between us and our colleagues in the development industry, because the fragmented nature of the way that housing in particular is procured, especially through design-and-build, means that the kinds of continuities that are necessary to achieve quality, and the feedback mechanisms particularly that are necessary to achieve quality, are more or less absent. The profound satisfaction that we have from working on modern methods with developers who take the projects from site acquisition right through to completion with us involved overcomes most of those problems.

Dr Millard: At Laing O'Rourke, we recognised, probably seven or eight years ago, that the current construction model, with the levels of margin that are delivered and the appalling level of consistency of completion and all the other things that were around at the time, is, in the long term, not sustainable. The route that we pioneered at the time was recognising that taking a manufactured, off-site approach to increasingly larger proportions of what we do on-site could give us a significant benefit in our ability to provide certainty for our customers. We developed a set of products that are now very mature and that we apply across all sectors in education, hospitals, industry, shopping centres and residential, which has proven, through a kit-of-parts approach, to drive the quality of schemes up and to drive the productivity up significantly. We are talking about a 60% reduction in the amount of manpower on-site and probably, overall—including recognising that there is a factory behind that too—up to 40% productivity over a traditional approach. Additionally, there is a 30% reduction in timeframe. That helps us to create our market, in terms of the way we attract market, and in fact now moving forward, for all residential schemes for which we now bid and aim to construct, we will be using a similar off-site-manufactured approach.

I would emphasise that, when I say “off-site manufactured”, as was mentioned in the previous panel, it is not moving work from site into a factory. You have to re-establish what the work is. You need to design it, engineer it and process it to be manufactured properly. Equally, you cannot just process it to be manufactured and expect it to perform to the same levels and standards. It is an engineering process and to do MMC properly is an engineering product development process that takes a while to do against standards. You need to prove the performance of



what you are doing and to invest in the development of the manufacturing process, so that you do then genuinely create the productivity and the quality that is clearly possible.

- Q46 **Chair:** Just coming back to Ben Derbyshire's point, you talked about your architect's practice working closely with developers. If you went along to Laing O'Rourke, they would tell you, "This is how we do things. That's is it," would they not? Where does the architect come into that? Are you not a bit redundant in that process?

Ben Derbyshire: I invite you visit the practice and some of the schemes. Especially in urban areas, there is a tremendous amount of moulding of the scheme to undertake. Amongst the different tenures, there are different requirements amongst our clients. Of course, amongst those tenures are clients who want individual customisation, so there is the whole range of opportunities in mass customisation. I should stress that our clients include developers who are currently building, to our design, the tallest modular high-rise in the world, in Croydon, on the one hand, and we have also been involved with Kingspan Potton, who design individually customised homes for single families. It is an enormous range and, most certainly, there is a requirement for the design team to be involved.

I just want to add something to that, which is that what we do not have to do is waste our time. I have evidence with me, which I can leave with the Committee, based on a comparison between two very equivalent-sized schemes, where the principle of off-site-manufacture is build it twice: build it once virtually, as it were, and then build it as designed. As often as not, unfortunately, in traditional design-and-build procurement, you find yourselves messing around with changes on-site till the cows come home. We measured the resource requirements for two equivalent, pretty significant-sized projects, to discover that almost all of the wasted time on-site is eliminated by off-site manufacture. There are all sorts of things that the design team do not have to do, and it is a great relief to us because, by and large, they are terrible waste of everyone's time and money.

Ivan Harbour: I would echo that, but as soon as you get some density, design is required to resolve a series of problems that will be site-related. The flexibility of an MMC or modular system has to take into account the fact that not all sites are rectangular or have plenty of space. An integrated approach that involves the design team, the client, the fabricator and the engineer all working together on one platform is absolutely essential to the process. Certainly, it is the most up-to-date use I have seen of BIM 360 in operation, showing that, when the scheme gets to site, it is all there. You know how many pieces are in it, how big the pieces are and, therefore, exactly what the building is going to cost. There are no mistakes in this. When delivered, if it is delivered as planned, you are providing a building, in principle, without defects. That is virtually unheard of in the construction industry, where we understand



that you can allow up to 5% of your construction cost to make good things that people messed up during the process.

Dr Millard: I agree with panel members completely. It is about engagement between the construction operation and business and the design business to liberate the value out of design, but equally to engage to create the integration of the manufacturing kit of parts. You might build a building out of 8,000 parts, and they can be radically different scheme to scheme, but it is the principle of creating 8,000 parts that are designed and engineered digitally and brought together. In a manufacturing process, if you are building such a building or such a residential development, if the factory has shipped 4,000 of those parts, you have half-built the scheme and they are not sat on the pavement somewhere. You get the associated benefits significantly, as was mentioned previously, in terms of the environmental impact. The speed of construction on-site and the lack of labour on-site reduces the local environment impacts, helps site cleanliness and reduces the space required to achieve the same level of construction, with all that born from good design and the integration of design, and early engagement of the construction supply chain.

Q47 **Matt Western:** I have to say I cannot help but think a modular Parliament building would be quite useful for us. If you could come up with one of those that you could develop off-site and then just put it in in a few days, that would help us all.

I want to expand on the sector in terms of how this can be used. It is traditionally thought of as being applied to social housing—public housing, perhaps—but do you think that the replicated template model, which is seen as cheap to produce, install and build on-site, applies just as readily to the private sector?

Dr Millard: As far as we are concerned, it is absolutely tenure-blind. We have had estate agents visiting and valuing properties designed as social housing that they would recognise as saleable as private housing. Again, this discussion is really about a notional image that this sort of approach has, which in the modern day it does not deserve. Today, in terms of the way these things are made, you have the precision of the computer married with the flexibility of people to make something that is flexible enough that everyone can have one that they like and is made accurately enough so that it exceeds all expectations in terms of regulation. The ones that we are doing are zero-carbon and match Passivhaus in terms of their energy consumption. It is just a better way of making things. You would not buy a car if it was built in a field. Why would you buy a house in the same manner? We feel that, traditionally, the second-most expensive purchase has more thought about it than the most expensive purchase that any of us might make.

Ben Derbyshire: I would echo all of that. I would add that not only is it precision constructed but I have brought a little booklet that I am very happy to leave behind, illustrating that the kinds of projects that we are



designing and delivering look robust. They have solid facing material and there is no reason on earth why anybody should regard them as being any less, in their perception of the construction, solid than so called traditional.

I would echo the point once again, having sat on the All-Party Parliamentary Group for Excellence in the Built Environment, on the question of the ombudsman, that there is a tremendous disquiet amongst the private house-buying public as to the quality of what they purchase in the so called traditional field. I am inclined to think that, these days, there is no such thing as traditional. To a very great extent, people are always adding and innovating. One of the problems is that the accretion of innovation upon what you might call a traditional platform is what is giving rise to many of the problems. You start filling cavities with squishy stuff, and suddenly you discover that it is transmitting moisture across it. It is much better to start from scratch and consider the whole thing in a holistic fashion. In my view, if the building ends up looking robust and having materials that are solid and lasting—especially facing materials—then the interstices are much more likely to have been thought through in terms of their longevity.

Q48 Matt Western: Presumably, it is quite easy to provide or deliver variety on-site in terms of these developments, because you are just putting different panels on.

Ben Derbyshire: The only reason we are not doing that at the moment, in my view, is for the reasons that Mark Farmer elucidated previously, which is to do with the way that projects are funded. The private, speculative sector is not there yet. Most of the large projects that we are doing are built for rent. In the build-for-rent market, individual customisation is not the thing. What the thing is is a very predictable maintenance regime, with easy access to those bits that need to be routinely replaced and, of course, with a carefully designed modular system. All of that is eminently achievable.

Q49 Matt Western: There is a huge amount of uniformity in existing, traditional build processes on site.

Ben Derbyshire: There is.

Q50 Matt Western: Dr Millard, in terms of the work that you are doing at Laing O'Rourke, how much of the component element of manufacture is sourced from the UK in build?

Dr Millard: In our business, all of it is sourced from the UK. Our raw materials are not necessarily, because we do not manufacture or mine all the raw materials in the UK, but our primary processing is in the UK. We have a factory in Worksop, where we manufacture largely precast-concrete elements. Our manufacturing systems integrate with steel, so we have steel-and-concrete-frame buildings. Talking about private-market MMC, for example, Clarges, which is a building on Piccadilly and one of London's most expensive apartment buildings, was built by us



using MMC methods. It is a steel frame made of steel from a company in Rotherham, and the concrete elements were made in our factory in Worksop. That was combined with modularised mechanical, electrical and plumbing systems that were built in our factory in Oldbury. It was not quite the 70% that is our target. About 60% of that building was built off-site, delivered to site and assembled. That did not preclude us from then applying, to an extent, artisan trades in terms of the very high-end finishes that that building requires.

In fact, if I look more broadly than just Laing O'Rourke, and if I asked the question of our procurement team, "Is there anything that is part of our kit of parts that we make ourselves", be it our concrete elements, our steel elements, our modularised MEP, bathroom parts, utility cupboards—things that Mark was talking about—"that we could not source from the UK supply chain currently?" the answer would be no. We could buy it all from the UK supply chain. The supply chain is there and it exists. We lack a bit of confidence in using that supply chain, I would say.

Q51 Matt Western: Beyond Laing O'Rourke, perhaps, gentlemen, you could come into this as well. Is there an opportunity? If we do start building at scale in this sector using modern methods or however you want to describe them, is there an opportunity for us to be not just building that for the domestic sector but also to export as well as part of the industrial strategy?

Dr Millard: In an export sense, I would say, taking it down to the digital model, I might just give an example. In one of the new businesses in Rotterdam, they print, by welding with a robot, propellers and things like that for major boats in service, because they are very difficult to obtain. Rather than sending propellers all the way around the world, they embedded that inside a container, and they send the container around the world and just send the digital programme to print locally in different dockyards around the world to make components. Exactly the same methodology can apply in our industry.

The key to the integration of building this capability is to give us that ability to give engineered solutions that have proven capability, meet standards and have longevity, and that are digitally modelled. The IP that sits within that digital model and the manufacturing process is the prize. We can export components, parts and systems, but we can also export the IP and the capability to manufacture locally to businesses in other places around the world. In our MMC world, that is a very exciting opportunity.

Ivan Harbour: We are partnered with an international organisation that has contacts all over the world. I would say that the IP that we have in modular construction is probably ahead of the pack at the moment, so there is something saleable there. Certainly as designers worldwide, British design is recognised as always pushing the boundaries. We have an education system that really supports that.



I would say that it is more a way of thinking than purely a material thing. We can make these modular assemblies all from UK product or all from product abroad. At the moment, we might have about a third of it made abroad but it can all be done here. The thought process is the most valuable process, and then being able to source the best product follows.

Ben Derbyshire: I do not want to repeat anything my colleagues have said but would just point out that, at the RIBA not so long ago, we had an incredibly popular exhibition. It was called "The Brits Who Built the Modern World", and Rogers Stirk Harbour was one of the featured firms. I want to reiterate, on behalf of the British profession, that we do have that international brand. As part of the design sector, we have a huge opportunity for expert potential. I do not want to raise the "B" word here when we are talking about the "C" word, but I do think we must enable the continuation of the global exchange of talent in order to continue the advantage that we have. That is a point of view shared not only amongst the Britain institutes but I made that point to the Architects' Council of Europe of the 27 other institutes of architecture, and everybody agrees we must keep moving between countries as a profession in order to enable that kind of innovation.

That brings me on to another major issue here, which is that we believe that the professions should be helping and supporting Government towards a more sustainable built environment. We are not going to get there unless we make major strides by using some of these innovations, and that, again, is a global issue.

Q52 **Andrew Lewer:** We have all heard about MMC and how effective it is, how well it works and how it negates all sorts of problems that traditional methods encourage or at least lead to occurring. Why are the main housebuilders—and, indeed, smaller ones—still apparently so determined to continue to use traditional methods over MMC?

Ben Derbyshire: First of all, they do not need to. The demand-side subsidies that are available to them and the business model that they have have enabled one of the majors to deliver a net profit just announced that leads to the question: what possible incentive would there be for them to make the major shifts that are necessary? From the RIBA standpoint, we are strong supporters of the major conclusions of the Letwin review, from two aspects. First, some mechanism of land speculation control is going to be necessary in order that we can build quality into the outcomes of development. The other is to require diversity, especially in the buildout of large sites and the way in which we plan and procure them. If we were to do that, we would not have to rely on changing the mindset of the majors. If you want to obtain a different outcome, you can create an environment in which they will respond—some of them but not all of them—but the answer, as has been previously said, relies on creating opportunities for small and medium enterprises. With the greatest of respect to Laing O'Rourke, the major



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housebuilders are, relatively speaking, leviathans in comparison to these mid-sized companies.

Ivan Harbour: I would say that you may be alone. It is a transformative process at all levels. It is non-confrontational. It does require genuine collaboration. It is about the best value. In doing this work, it has been the closest to me that I have called legitimate value engineering. It has not been about cost-cutting and cheapening. In fact, the lovely thing about this process is that you do get more for your money. You literally get your own ceiling and your own floor: it is not someone else's ceiling and you are not someone else's floor.

Dr Millard: There are three things that really hold us back in moving this technology forward into construction. As has been mentioned, there is not a burning platform for the current housebuilders. It seems that they make extremely good margins on a model that is building at the absorption rate, particularly in the private sector. Why would they want to change that materially? That does not give them, potentially, huge skills problems, because they are able to invest in the development of largely a captive supply chain to support that. That model, for a number of businesses, is not broken, so why fix it? That is not generating what the country needs in terms of the scale of housebuilding, so we, as a country, need to think of something different.

The second is that investment is required. If you are going to invest, you need to have a level of certainty of return. Our demand side is very incremental in terms of plot size. A big scheme is 500 units and, if I was going to build a factory, I might want to have an annual requirement of 2,000, 3,000 or 4,000 units. How do I collect together that demand when it is all with different businesses, housing associations and councils? The mechanisms of the demand side are against it.

The third is that, as I mentioned, you need to invest. These are engineered products. They are not a product that has been evolved over many years through custom and practice and code, whereby you can look up online how to build a house. In an MMC model, you get something that is engineered to deliver the performance in a far more cost-effective and productive way. That engineering costs money and that investment costs money, and that requires investment in manufacturing facilities.

If I just personalise that, we are towards the end of a significant investment in the development of a 3D volumetric modular housing solution. The inability of us to gain investment from a market that is starved of oxygen, as our chairman Ray O'Rourke refers to it, in terms of the risk-averse nature of anybody wanting to invest in this area, creates that.

Those three things combine to create a pretty effective barrier to moving forwards: first, the lack of a burning platform; secondly, we cannot get the consistency of demand that allows for returns to be generated from investment; and that adds to already massively risk-averse nature of



investment in construction, which asks, “Why would we invest in something where we cannot see the return and we have no evidence of it working?” Those are really significant barriers.

Q53 Andrew Lewer: We heard from the previous panel about the fact that they tended to feel, notwithstanding everything you have all said, that we were reaching something that we would call a tipping point with this. Whilst those barriers were there, we are now at a time when this is all about to change anyway. Do you share that assessment?

Dr Millard: We are at a tipping point in the sense of a recognition of the need to move in this direction, for all the reasons that we have discussed. There are technological solutions appearing that enable that to be delivered. We have talked about Berkeley Homes. We have our own and we also have our DfMA solutions that we deploy; they exist and they are becoming available, but this is a fraction of a gap of about 150,000 homes a year that we need to find a way of building. We will creep across the line, if we are not careful, with a level of mature, capable products that are properly insured—the mechanisms are going in place and we have talked about the warranty mechanisms and other assurance systems—but without anything meaningful to drive stimulation in the market or to make the capital available. We will just inch across the line at nothing like the rate that we need to move at to deliver what I believe our country’s aspirations are in this regard.

Ben Derbyshire: I agree with that. Patronage of all kinds from Government and local government is going to be necessary to really exploit the moment we are at. It is a tipping point and, funnily enough, it is a tipping point that arises as a consequence of the coming of age of the private build-to-rent sector, which is institutionally financed. Some of the larger schemes we are doing—the tall building I referred to just now but also 2,000 homes in South Ealing—are happening because overseas institutional investors and direct foreign investors see the opportunity in the UK for private rented housing. Of course, many of the obstacles that Mark Farmer has referred to are absent from that marketplace because those investors have satisfied themselves as to the robustness of both the building construction and the business model.

Dr Millard: Government could certainly look at the idea of pilot projects, as they did, in fact, when they started the academies programme. That rolled into something that, certainly from the architectural profession, has been seen as a great success.

Q54 Andrew Lewer: You have talked about patronage and about systems to enable this to happen. If I could just compress this in order to move us along a little bit, could each of you reflect upon the role that you think Homes England could have in terms of its partnership with housing associations in pushing forward with a higher percentage of MMC, and also about the planning system of planning regulations and whether you see any significant shift being necessary there to move this forward as well?



Ben Derbyshire: Homes England has a huge opportunity here. It has an incredibly lively mind at its head and it has scale and ambition on its side. It needs to be emboldened. The kinds of scoring systems that are often used to “encourage” a proportion of MMC are all too easily overwhelmed by other aspects of the same scoring system, which mean that, for example, land value overwhelms the benefits of MMC. They need to be encouraged and enabled to provide structures for selecting developers that are more conducive to the delivery of MMC. Frankly, they need to be less susceptible to the influence of the majors, who will tend to come along and say, “No, if you really want it and you want it quick, forget about those requirements”. We need to be much more robust in all of that.

I agree with Ivan Harbour’s reflection on previous programmes. The much vaunted and, sadly, slightly flawed £60,000 house project of John Prescott produced some very good exemplars, and the housebuilders buckled to and delivered under it. The problem was, of course, that most housebuilders can build a house for £40,000 and do not need a limit of £60,000, so it was a bit misconceived. However, more robust disposal of public land, using land agreements that have a more specific requirement, has been very successful and we have some examples of that in this little booklet, if you care to look.

Ivan Harbour: Certainly, having a more integrated procurement model that is not reliant on delivering the lowest quality to get the job would be a great improvement in terms of something that considers bringing together design and construction. These projects are genuine design and build, where the design matters and the build matters.

Dr Millard: Homes England has the power to tackle all three of the things I mentioned as barriers. First, in terms of the housebuilders not wanting to change, they can be very muscular in standing back from that in terms of their brief being to drive demand and to create more capacity in the marketplace, not just the existing houses, and not buckling under pressure.

Secondly, they have £3 billion as an overall budget to stimulate and drive housebuilding across the country. A fraction of that invested in the supply chain would have such a disproportionate effect in terms of the gearing to create MMC capability that would drive capacity and capability that you would see the payback several times over through the subsequent execution of a plan. Investing through loan guarantee, through loan or through direct investment in businesses to drive MMC capacity is the second.

The third is that they can act to aggregate demand. They can work as a demand-correlator through the work in the schemes that they are involved with and be part of setting realistic targets for the application of MMC supported by the supply chain.



The Department for Education, by the way, has been doing some really good work on this and has set a really clear strategy. By 2023, 30% of schools will be constructed through MMC, which for them meant that 40% would be manufactured off-site. With that level of commitment, it is possible. The supply chain would invest and would gear up to deliver that, if it had that certainty. Homes England could do all three of those things.

Q55 Mary Robinson: Just briefly, we have spoken about local authorities and the planning processes in terms of planning permission, et cetera. Thinking about it in a wider framework of local authorities setting out their spatial frameworks and their local plans, et cetera, do they do enough and are they capable of doing more to press forward the different modern methods of construction?

Ben Derbyshire: I want to make another plug for Oliver Letwin's report because, for local authorities to require large sites to be subdivided such that the product, both in terms of tenure and design on them, is diversified, that is his answer to the problem of the glacial pace of delivery on large sites. That approach being adopted across the country would see diversity, and diversity is what we need.

On the subject of the capacity of local authorities, there we have a whole other problem. We have seen, through the years of austerity, that such capacity as they have had, especially in terms of planning, has been whittled away. The use of the word "planning" as an active verb has almost disappeared from the lexicon in real terms. It is mostly about stopping things happening that people do not want to happen. At the RIBA, we have a current project with other institutes in collaboration, which is all about celebrating proactive place-making. I would say about that that the necessary prerequisites for successful place-making are other than the matter of off-site manufacture and are all to do with connectivity with infrastructure, and with consultation and engagement with local communities. Those kinds of things are the kinds of things that will create, if a local authority has adequate resources to do so, great places. We must not confuse the means of production with the creation of successful mixed neighbourhoods in that way.

Dr Millard: The local authorities that we are dealing with do see the advantages, and it does not get in the way of the planning system. It is just about working with them. In fact, we currently have seven schemes, all with public bodies or local authorities; not one private-sector body yet as a client.

Ivan Harbour: I echo that. Local authorities can be very supportive. However, you end up with a completely different set of requirements from one local authority to the next for, effectively, housing the same purpose. Whilst there is lots of encourage and support, and we get on very well with a number of local authorities in that sense, there needs to be a way to create a more standardised set of requirements that allows us to respond to that. It does not mean that housing all looks the same—



not at all—but it is about the bits you do not see that you can standardise.

I will give an example, not in housing but in hospitals. We have one hospital in Wales and one in Brighton, both of which want completely different bathrooms, sanitary ware and shower valves, for completely different purposes, so you end up procuring, type-approving and validating twice everything that is performing exactly the same function. In housing that perpetuates in terms of the different views in a very fragmented nature around the country, and it is an enemy to MMC. It is not the fact that they look different. They can all look different, have the sense of place and provide the requirements that are there, but that is something that could be helpful with local authorities.

Ben Derbyshire: The chief architect of Birmingham City Council, when I was a student there in 1971, took me to his window in the Council House overlooking south Birmingham and said, “It is amazing what we have been able to ram down the throats of Birmingham man.” What is incredibly important is that we do not do anything that encourages the suggestion that factory-made housing is a simple and cheap solution to delivering numbers. That is why I am saying that the most important thing to encourage and enable local authorities to do is to make great places. At the RIBA, we have just published 10 factors for creating the places where people want to live. We have included a requirement for building places well, but the most important thing is creating mixed neighbourhoods that are well-connected and close to work.

Q56 **Mr Dhesi:** Mr Derbyshire, while there is consensus that the workforce will need to develop new skills if the industry is truly going to embrace MMC to a greater extent, I note that there is still a lot of debate surrounding how that training should be organised, whether we look at the Centre for London’s *Made for London* report or the Lords Science and Technology Committee report on off-site construction or, indeed, the Farmer Review, *Modernise or Die*. In your opinion, how could this training be delivered and who should be responsible for designing, delivering and financing this training?

Ben Derbyshire: I have to defer to colleagues, really, on this one, except to say that we have had great success with our trailblazer group, setting up apprenticeships in architecture. I gather, so far—and Mark Farmer may be able to correct me on this—that the MOBIE training centre, I suspect because it decided to engage with a trailblazer group of major housebuilders, not the SMEs who were really interested in creating the skills to do off-site manufacture, have not done so.

There is an enormous opportunity for a whole range of new apprenticeships, because making housing in factories is a place where people can learn on the job in a much more controlled way than they can on sites. If I were to offer one aspect of what must be a much more comprehensive answer from people who are in the skills-and-training sector more closely than I am, I would offer that we have been



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overwhelmed by the opportunity at the RIBA provided by our enthusiasm for apprenticeships, not least because of two really important factors. One is that apprenticeships offer much more social mobility. The earn-as-you-learn proposition enables people from modest backgrounds—

Q57 Mr Dhesi: Given the lack of time, who would like to answer that question in terms of the training? How can it be delivered?

Dr Millard: Through apprenticeships is absolutely right. There is a natural upward spiral, if you like, in MMC in that sense. As you say, the factory environment is better for training than the site environment. It is more controlled. Apprenticeships are good. We have done a trailblazing apprenticeship on digital engineering technicians, moving digital technology would. Having completed the apprenticeship, it took over two years for Government to approve that once it was complete, so we need to look at that process in terms of approval. Raising the status of T-levels alongside GCSEs and A-levels is important.

Importantly—and I will make a request of my colleague, Mr Derbyshire, here—our institutions need to take on the responsibility, through their work in growing the professional talent, to teach how we design for MMC. The design and engineering requirements and skills in the professional population are different, and we need to look at that through the whole of the university and professional structure to deliver the front end of this that stimulates the whole process.

Q58 Mr Dhesi: I would like to move on because I have a couple of questions and we are really running out of time. In your opinion, Mr Harbour, the Farmer Review of labour suggested that there should be a charge imposed on business clients of the construction industry, that those proceeds should go partly towards funding for skills development, that the charge should be set at no more than 0.5% of construction value and that clients should be able to avoid it by demonstrating how they are contributing to industry capacity-building. What do you think of this suggestion and what impact do you think it would have on your work or on the industry itself?

Ivan Harbour: The most important thing that we do is not just think about the receipts at the end of the day but to think about the future, and to plan with that future in mind. In this situation, what I find really exciting about MMC is that there are roles in the digital world for design, manufacture and assembly. Those three aspects really cover a gamut of abilities, whether more manual or more mental. In my mind, that is a good future for the industry. It is a broader future for those involved because it is not building outside in a field but building under cover, perhaps next to a field but under cover all the same, in a better environment.

Q59 Mr Dhesi: Mr Derbyshire, do you think that is a good idea?



Ben Derbyshire: A fiscal measure would be a great idea. We have jumped to and produced apprenticeships for professional qualifications largely as a result of a fiscal measure.

Q60 **Mr Dhesi:** In your view, Dr Millard, would imposing such a thing on business clients be a good idea?

Dr Millard: Anything that is uniform, and therefore does not distort the market because it applies to everybody or every contract, will work, provided it provides the stimulus for people to avoid it by demonstrating how they are moving the market forward, moving skills forward or driving the capability of the industry forward in a meaningful way, because that is what we want. In that sense, I entirely agree with that type of mechanism.

Q61 **Mr Dhesi:** Lastly, Dr Millard, in terms of construction workers, Laing O'Rourke does a lot of work in London and it is estimated that 28% of all workers are from the EU 27 states. Brexit has the potential to result in the departure of many individuals currently employed in the industry, particularly in London and the south-east. How can we overcome that skills gap that could emerge post Brexit?

Dr Millard: One is to work very hard to prevent that skills gap occurring in terms of our European colleagues who joined us. We work very hard—and I know, having spoken to my colleagues across other construction businesses with large London portfolios, that they are working hard—to ensure that our valued employees from EU countries are supported.

Mr Dhesi: You would also acknowledge that many of them have already left.

Dr Millard: We are enabling them through the application for residency. We support them but, equally, there is only one real route to that, which is to support the training of more local people, which is difficult because nobody wants to join the industry. The second, which is our declared strategy, is to move as much work as possible off-site into factories or into the supply chain to do that. That is our strategy and I know my colleagues are looking at similar strategies across the industry.

Q62 **Mary Robinson:** A person may set their sights on building this fantastic new MMC-built house but they have to get a mortgage, which could be a problem for them sometimes. Why is it that mortgage lenders, insurers and investors are still wary of engaging with housing developments built using MMC?

Ivan Harbour: There are not enough examples. They are risk-takers and they measure their risk on what is there. I have to say, however, that, if I was in that business, I would rather lend money to something that was made well than to something that no one knows how it has been made.

Ben Derbyshire: I agree with that but I want to just pitch a slightly different angle in answering this question. We have to persuade them of



the predictability of the outcomes of using this kind of construction. One of the ways we must do that, in my view, is to require the industry to be more consistent in the way it evaluates projects post completion. Post-occupancy evaluation, thoroughly, always and on a more consistent basis, across the marketplace, is going to provide the evidence that we will need because, at the moment, it is based far too much on emotion.

Dr Millard: As I mentioned right at the start of this evidence, this is an engineering process to create proper MMC product, through consistent standards that Mark is leading on, and we are supporting other, similar initiatives, to create an assurance regime that provides a standards base that all MMC product goes through in a consistent way, which is not a barrier but a hurdle that is jumpable. We were talking earlier about that, so thank you, Ben, for that. Everybody must achieve that and we must follow that so that we ensure the quality of what we do. There is huge benefit from a factory-production process: no faults forward, consistent quality and predictability of certainty of delivery. That is only good if the product that is being manufactured has been engineered properly and it is proven, through test and validation against clearly defined standards and specifications, that it meets the requirements that are required of it. That is a really important process that we, as an industry, with Government support, get properly joined up.

Q63 **Mary Robinson:** Would you support the assurance scheme that is being worked on at present?

Dr Millard: Absolutely, 100%.

Ben Derbyshire: Quite so.

Q64 **Chair:** Very briefly, what one major change would you like to see to make sure that we can increase MMC development across the country?

Ivan Harbour: For me, it is the procurement. The process of procurement today tends to give you the conventional answer. It is very difficult to pitch for work with MMC when you are compared to something that feels as if it is more known and therefore more credible.

Ben Derbyshire: Demonstration projects. The big one would be a national housing expo, and it would be required to showcase MMC. It could be in Sheffield.

Dr Millard: For me, it is investment. The cost of change is significant for the industry and the partners in it. I have mentioned all of the barriers in terms of the reluctance to put money at risk in the construction sector at the moment, for the reasons that we know about: certain company collapses, the political situation, life on the high street and everything. We need investment to make this change. We are capable of doing it. If you can make investment available to us to put into MMC facilities and bring that that is virtually there to life—not just us but our partners in this space, because we are all in the same place—we can deliver for you



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with the investment. Through Homes England and the funds, you have the availability to do that.

Chair: Thank you all very much for coming to give evidence to the Committee this afternoon.