

# Making the most of MMC

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**As the use of modern methods of construction gathers momentum, Andrew Little reviews progress, potential and barriers to entry**

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Precision-manufactured; pre-manufacture; modular; prefabricated; volumetric; hybrid: these are all terms with which you may be familiar to describe off-site construction. Signals from the UK government, though, thankfully indicate that it is now settling on the single term 'modern methods of construction' or MMC.

It is fair to say that, in the past 2 years, adoption of MMC has been gaining traction in response to modernisation of construction techniques across the industry, a trend being driven by existing and predicted labour shortages, building information modelling (BIM) and wider advances in manufacturing technology, materials and automation.

In 2016, Mark Farmer set down various challenges to what he branded a 'fragmented' industry in his review [Modernise or Die](#). This identified pre-manufacture as one of the potential solutions to threats faced across the industry, and the subject of MMC is therefore rising up the agenda.

## Then and now

Such systems have certainly advanced since first rolled out to address the housing crisis after the Second World War, which saw a need for 750,000 new homes. Between 1945 and 1951, 156,000 homes were provided across the UK, typically 2- or 3-bed houses with integrated plumbing and heating that were each constructed within 40 hours.

Despite a 10-year lifespan, many of these houses lasted much longer, and some 330 of them still remain occupied today. A second wave of prefabricated construction followed, commonly referred to as 'PRC' (precast reinforced concrete), and this took the form of houses built using reinforced concrete panels in a variety of combinations. Types included Airey, Cornish, Wates and Unity, and 1.5m such homes were built in the decade after 1945.

Some 70 years later, we again find ourselves in a housing crisis. The industry's current 160,470 new-build completions, as per Office for National Statistics figures for the 12 months to March 2018, fall short of the annual 300,000-home target; so as demand continues to outstrip supply, there is a major opportunity for MMC and digital technology to help redress this shortfall and overcome barriers to growth.

## Current systems

I think it is fair to say that MMC has suffered from a chequered reputation in the past and is largely regarded as untested in the present. However, development of systems has certainly been refined in recent years, with benefits in terms of cost, time and particularly quality being well publicised.

The industry has recently focused on stimulating the development of MMC capacity so as to increase housing supply, and the UK government has sought to fulfil this aim by specifying that a proportion of dwellings procured using public funds or on government-owned land will have to be constructed using innovative techniques – effectively, MMC. In response, a number of housing providers have established their own MMC product and manufacturing base or partnered with housebuilders and main contractors to meet targets for new homes.

As technology has developed, so have more sophisticated systems. These include fully fitted volumetric units – typically made of light-gauge steel, timber or concrete frames, individual pods for integration into a load-bearing structure, panellised systems, and individual sub-assemblies and components such as prefabricated foundations, floor cassettes, roof cassettes and pre-assembled roof structures.

## Potential

'So why would I consider MMC as an option for one of my schemes?' Well, the truth is that cost and performance data is limited, compared to that for more traditional construction techniques, and lifecycle and maintenance information is still unavailable as systems are in their formative years and have not yet been subject to robust monitoring.

However, there have been suggestions that a well-designed and programmed fully fitted volumetric solution made with MMC has the potential to reduce a programme duration by 20%, with costs 40% lower than those for traditional techniques.

Perhaps the greatest benefit of using MMC, where most value can be realised, is the potential it offers for significantly improved quality. Ensuring quality is one of the biggest challenges for the industry, brought into closer focus after the Grenfell Tower fire, and indeed this is a central theme in the [Hackitt Review](#). With this perception that build quality is declining, we should not forget that more conventional construction continues to provide a good-quality product; but quality still needs to improve, if only to meet higher performance standards. The industry is collectively calling for improved quality, and this is advocated, for instance, in the Farmer and Hackitt Reviews.

MMC certainly goes some way to addressing these challenges by having a dedicated workforce manufacture systems in controlled conditions, and this has the potential to provide more consistent quality across the industry.

## Product-led approach

Where MMC is considered an option, it is important that off-site suppliers are engaged early and integrated into the design team, and that a product- rather than project-led approach is adopted to ensure optimum value.

Constraints will be unique to each project, and could concern manufacture, handling, transportation and installation, as well as site-specific criteria such as geotechnical conditions. These design considerations are highly important and should not be overlooked, as doing so may entail expensive bespoke solutions later in the project. Off-site manufacture therefore provides a great opportunity to make full use of BIM by allowing all disciplines involved to collaborate fully in a data-rich environment.

Procurement also needs to be carefully considered. There is currently a view that design and build contracts are not suitable for MMC and that bespoke alliancing models may be more appropriate, bringing together contracting expertise, logistical knowledge and a supply chain with an integrated project insurance model that would enable common product platforms and

mass customisation. As building surveyors, we have a key role to play in due diligence on any procurement model to ensure it is not only fit for purpose through the initial design and construction stages, but also throughout the lifecycle of the asset itself.

## **Instilling confidence**

As lifecycle performance data for MMC is limited, there are thus understandable concerns about quality and durability. This creates a challenge for warranty providers and stakeholders, including mortgage lenders, valuers and building insurers.

Through increased output, standardisation of systems and analysis of performance, insurers' concerns about failure and potential claims can be reduced by instilling confidence in product quality, particularly where independently certified with a 60-year design life and a clear structure for future maintenance set out.

The sector has also developed dedicated insurance measures in the form of the [Build Offsite Property Assurance Scheme](#) (BOPAS), and bodies including [NHBC](#) and [LABC](#) are now able to offer independent cover for off-site manufactured products as well, subject to third-party verification.

## **Barriers**

MMC offers an opportunity to tackle many of the challenges the industry faces with regard to quality, skills shortages and the increasing gap between housing supply and demand. There are, though, a number of barriers to adoption and risks that need to be understood if MMC is to become as common as more traditional techniques such as bricks and mortar.

The most talked-about of these barriers is that funders find it difficult to invest in this kind of production model without visibility of future demand. The public sector has a key role to play in overcoming this by establishing procurement and joint venture models that will help to stimulate demand. These would share risk in a collaborative working environment and programmes would cover the longer term rather than being one-off pilots or small-scale developments.

Transparency of capital and operational costs is key, including greater cost information and performance data – especially when a client will ask how the cost compares with more traditional techniques. Currently, there is a degree of confusion around this subject, and without doubt there is a need for sensible, credible benchmark data.

There are also significant concerns around bespoke products and risks associated with insolvency, both during construction or in the future. This risk has focused attention on standardisation and development of a potential MMC design guide, but this is likely to prove another challenge as most companies have invested heavily in their intellectual property and products. While they may be reluctant to share knowledge, progress towards a common product platform and mass customisation is considered a necessity, and a design guide would enable such standardisation of interchangeable component parts.

Bespoke insurance measures such as BOPAS are also complemented by existing warranty providers, including NHBC; however we still need to move towards a position where warranties, insurance and general mortgageability become as common and accessible for MMC as they are for traditional building methods.

Finally, as many MMC companies are small or medium-sized enterprises, there are issues around cash flow, security and insolvency, while the production model often requires significant upfront payment. Clients are understandably nervous about these, fostering a risk-averse attitude to MMC; however, this only emphasises how important it is that local authorities, developers, registered providers and MMC specialists collaborate in joint ventures or alliance arrangements that, if robustly established, will go some way to addressing the challenges faced across the industry and improve housebuilding growth across the UK.

**Andrew Little is a partner at [Baily Garner](#)**

### **Further information**

- Related competencies include [Construction technology and environmental services](#)
- This feature was taken from the [RICS Building surveying journal](#) (October/November 2018)
- Related categories include [Modern methods of construction](#)