

Modern Methods Of Construction



What can MMC offer the housebuilding industry in the UK?



Photo Urban Splash

Building momentum

There are increasing signs that the housebuilding industry is closer to adopting more Modern Methods of Construction

Over 50 years ago there were calls for the widespread adoption of non-traditional construction methods to achieve house building targets. Sound familiar? In 2018, the House of Lords Science Committee was told that the use of offsite manufacture was the only way to achieve the government target of 300,000 homes per annum.

Accurate statistics are hard to come by, but the best estimates are that traditional construction accounts for over 90% of housebuilding in the UK. The remaining c.10% of homes use Modern Methods of Construction (MMC). But there are signs of change. These were emerging before Covid-19, however, the pandemic could accelerate change and be the turning point for the industry to truly embrace MMC.

Drivers of adoption

Many factors impact the adoption of MMC, but looking at international examples show that the three main drivers are: the cost and availability of labour, housing supply shortages and regulatory or governmental intervention.

The cost of adopting MMC is generally higher than continuing with business as usual, reducing the incentive to change. However, labour shortages are driving up construction costs. Adoption of MMC, which improves productivity and reduces onsite labour, offers a potential solution.

The supply and demand imbalance of homes is a further driver for adoption. There is a growing acceptance that

‘business as usual’ is not good enough and something has to change. This is causing more and more developers and housebuilders to look at supplementing traditional construction with MMC.

The need to improve energy efficiency and reduce the environmental impact of housing and housebuilding, is a further driver of change. Using traditional techniques it is very difficult to achieve high levels of energy efficiency and studies show substantial material wastage. However, building homes under factory-controlled conditions allows much tighter tolerances to be met, improving energy efficiency and significantly reducing waste.

Growth potential

Before we entered the current pandemic the UK was already facing the three main challenges that have spurred greater adoption of MMC globally. The UK is already facing labour shortages in the construction sector. The Farmer report highlighted that between 2016 and 2026 around 62,000 workers would retire each year. However, the government’s latest figures show only around 23,000 new apprentices starting each year. This is likely to be exacerbated by changes to the immigration system once we leave the EU. 10% of the 2.2 million people that work in construction in the UK have migrated here. Research from the IPPR suggests that 59% of the current construction workforce that has migrated from the EU would



The proportion of homes using MMC over the next 10 years will rise from today’s 6-10% to closer to 20%

Defining Modern Methods of Construction

MMC is a ‘catch-all’ phrase that means different things to different people. With this in mind in 2019 the Ministry for Housing Communities and Local Government published a definition framework. This set out seven categories for defining MMC, the first five of which use offsite construction

CATEGORY 1

Volumetric modular
Segments of buildings manufactured offsite in 3D and fitted together onsite.

CATEGORY 2

Structural panelised
Wall and ceiling panels or frames that are manufactured offsite and assembled onsite.

CATEGORY 3

Offsite components
Structural elements, such as load bearing beams, columns and slabs that are built offsite.

CATEGORY 4

Additive manufacture
Printing parts of buildings, either on or offsite.

CATEGORY 5

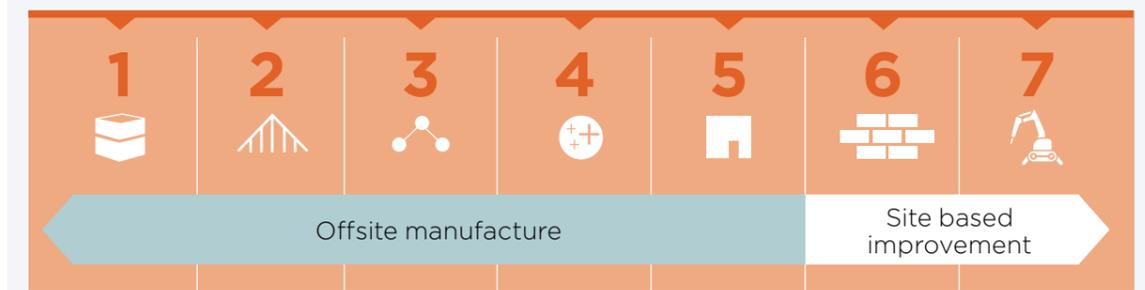
Non-structural assemblies and sub-assemblies
Non-structural components that are manufactured offsite, such as pods, utility cupboards and risers.

CATEGORY 6
On-site building material improvements
Ways to reduce on-site

labour by using new materials, such as large format blocks or pre-cut components.

CATEGORY 7

On-site process improvement
Use of innovative techniques, such as lean construction, digital augmentation, robots, drones and exoskeletons.



be ineligible for a visa under the proposed new rules.

Despite housing delivery increasing steadily over the past few years, the number of new homes built still needs to increase by 24% to reach 300,000 homes per annum. This is going to be an extremely tall order using traditional construction alone.

If we are serious about meeting the pledge to be carbon neutral by 2050 then the energy efficiency of homes will need to dramatically improve, along with reducing the environmental impact of construction. Both things that MMC is well placed to deliver on; highlighted by the homes that Etopia UK are building, which use 39% less CO2 during construction than traditional construction and are expected to save 167 tonnes of carbon over 25 years of use.

These three factors will lead to increased adoption over the next decade. We expect that over the next 10 years the proportion of homes built using MMC will rise from today’s 6-10% to closer to 20%.

Covid-19 has the potential to accelerate this. The Homes for Heroes campaign, if fulfilled, would provide the certainty of demand that manufacturers need to attract investment and scale up operations. Also, building in a factory environment makes it easier to implement social distancing requirements while maintaining high productivity.

Homes for Heroes

Echoing drives to build homes for returning soldiers after the two world wars, on 12th May 2020 the Homes for Heroes campaign was launched. The initiative, which is backed by the G15 group of housing associations, modular manufacturers, the British Property Federation and architects, aims to persuade government to set aside public land for 100,000 new offsite constructed homes. These homes would be delivered over a five year period and be for key workers.



Photo Etopia UK

Factory fresh

The North and Midlands are emerging as centres of excellence for MMC

The previous housing minister, Esther McVey, was a vocal advocate of MMC and trumpeted the creation of a ‘Construction Corridor’ across northern England. This aimed to create a centre of excellence for MMC.

Construction Corridor

The Government’s support for MMC manufacturing in the North serves not only the ‘levelling up agenda’ but also reflects where there is an emerging cluster of factories.

Our research has identified around 80 factories that are actively supplying the residential sector. These include those building volumetric modules, timber and steel frames, panels and assemblies.

While there is a broad distribution across the country, there is a clear cluster running across the North West and Yorkshire and the Humber. This area is home to a third of all factories in the UK. These include three of the largest manufacturers, Etopia in Cheshire, Legal & General Modular just east of Leeds and ilke Homes in Knaresborough.

There is a second large cluster in the Midlands, with almost a quarter of factories. These are often found close to the motorway network, allowing easy transportation across the country. The main manufacturers include TopHat, Urban Splash and Sekisui House and Elements Europe.

The Welsh government is actively encouraging the sector, specifically to support the delivery of new social housing. This includes financial support for manufacturers, as well as a push for a ‘Welsh First’ approach to procurement. This has resulted in a number of factories locating and building supply chains within the country, which is now home to 16% of UK factories.

Where are MMC schemes?

One of the benefits of MMC is that the factory doesn’t have to be located near the site, which means high demand areas in London and the South East can draw upon the manufacturing capacity elsewhere.

We have identified over 100 schemes in the development pipeline utilising MMC. Combined these total around 17,000 new homes across a mixture of open market sale, Build to Rent (BTR), co-living and affordable tenures.

In terms of geographic spread, the majority of the new homes are due to be delivered in London and the South East, which mirrors where demand for new housing is highest. This includes Greystar and Tide Construction’s Ten Degrees, 100A George Street in Croydon, which is the world’s tallest modular tower and will deliver 546 BTR homes when completed. MMC’s faster construction make it a good match to BTR development as buildings become income producing earlier.



Photo TopHat



A benefit of MMC is that the factory doesn’t have to be located near site

There are also concentrations of MMC delivery coming forward in the North West and Yorkshire & the Humber, including Urban Splash’s schemes at Wirral Waters, Birkenhead, and New Islington, Manchester, as well as a number of schemes by ilke Homes.

What is being delivered?

Of the roughly 10,000 new homes we have identified, almost half are being brought forward on open market sale schemes. These include Urban Splash and Sekisui House at Northstowe, where they will be delivering 406 new homes, of which 325 are for open market sale.

But what is interesting is the level of delivery on wholly affordable housing schemes. While these only account for around a fifth of total units, they account for almost half of all schemes. This reflects a more cautious approach being taken by many housing associations and local authorities who are running small pilot programs. This is borne out looking at the average size of an affordable only scheme, which is only 45 units compared with 131 for an open market sale scheme.

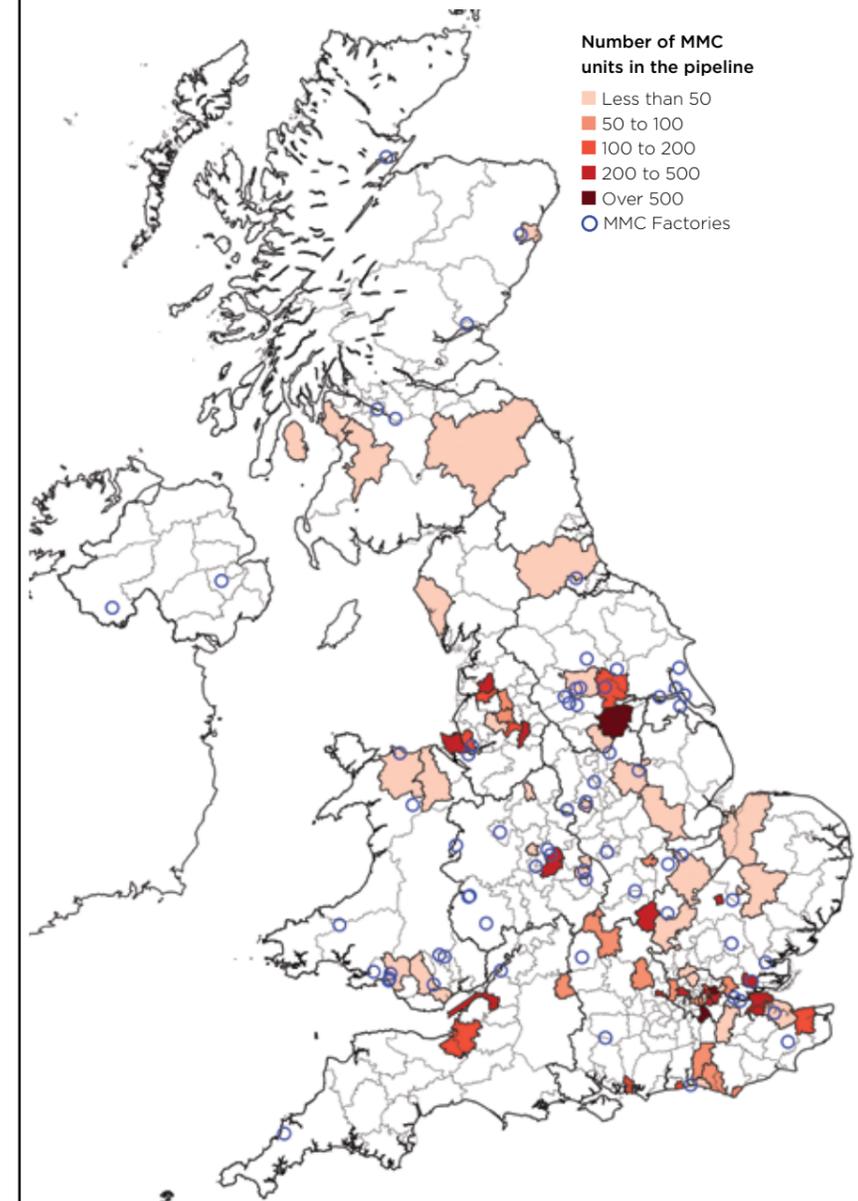
Where next for demand?

In the short term, demand for MMC is likely to be driven by the need to increase housing delivery and shortage of construction workers. While we expect demand to arise across the country, these two drivers indicate it is likely to be strongest in London, South East and East of England.

These are the regions showing the largest supply and demand gap and related affordability challenges. Furthermore, London’s construction industry is heavily reliant upon foreign labour, particularly those from the EU, whose access is likely to be impacted by the proposed new immigration rules post Brexit.

The big question though, is how much will the disruption caused by Covid-19 drive wider adoption across the country and super charge demand nationally?

Where are MMC schemes being delivered?



Source: Savills Research

“ We have identified 80 MMC factories across the UK that are delivering 17,000 new homes ”



Photo Legal & General Modular Homes

New use for warehouse space

Up to 40 factories needed across the country to meet construction demand

This paper has referred to ‘modular housing factories’ however, in the most part, the buildings being used for construction are often warehouses designed with retail logistics and distribution in mind. The logistics warehouse benefits from many features which facilitate the assembly of modular housing components such as ample height, access doors for deliveries, proximity to the main road network for onward distribution and the availability of large energy supplies to power tools and machinery.

Industrial impact?

Clearly there are market and political drivers which over the next decade will determine the growth of modular housing in the UK. However any increase in delivery of modular homes

needs to be met with the delivery of construction capacity which will therefore result in more warehouse space being leased or purchased by modular housing companies.

Based upon our analysis of the existing market we have identified that 150 sq ft of additional factory space is required per each additional unit that is delivered by MMC. The analysis also demonstrates that the average size for a factory has settled around 150,000 sq ft after an number of significantly larger units were taken in the early stages of this new market emerging.

We have mapped out four potential scenarios over the next decade which show MMC increasing its proportion of the market by 5% and 10% but also the industry as a whole increasing its annual delivery to 300,000 units.

As MMC delivery increases so does the need for warehouse space

	Proportion of MMC new homes	Annual delivery of new homes	Uplift against current MMC delivery	Additional Industrial Space needed (sq ft)	Additional factories Needed
Scenario 1	15%	200,000	10,000	1,500,000	10
Scenario 2	15%	300,000	25,000	3,750,000	25
Scenario 3	20%	200,000	20,000	3,000,000	20
Scenario 4	20%	300,000	40,000	6,000,000	40

Source: Savills Research



A key enabler of MMC growth will be the award of contracts from local authorities and housing associations

In our most optimistic scenario an additional 40,000 units are delivered annually by MMC. This results in the need for an additional 40 factories across the country which total 6 m sq ft. If all of this capacity was required imminently then it would increase the average amount of transactions for warehouse units over 100,000 sq ft by 37%.

More likely however is that units will be taken over a longer period of time as demand from modular house builders ebbs and flows.

Bespoke or 2nd hand?

The availability of warehousing is historically low, as demand has spiked as online retail has grown. Indeed vacancy rates stand at just 6.8% compared with levels around 15% almost a decade ago.

Our analysis shows that, to date, the majority of factory space for MMC is actually second hand logistics warehousing which has been retrofitted to the needs of the construction company. However, as the industry matures it is likely that

construction efficiencies will occur that will warrant the delivery of a more bespoke facility.

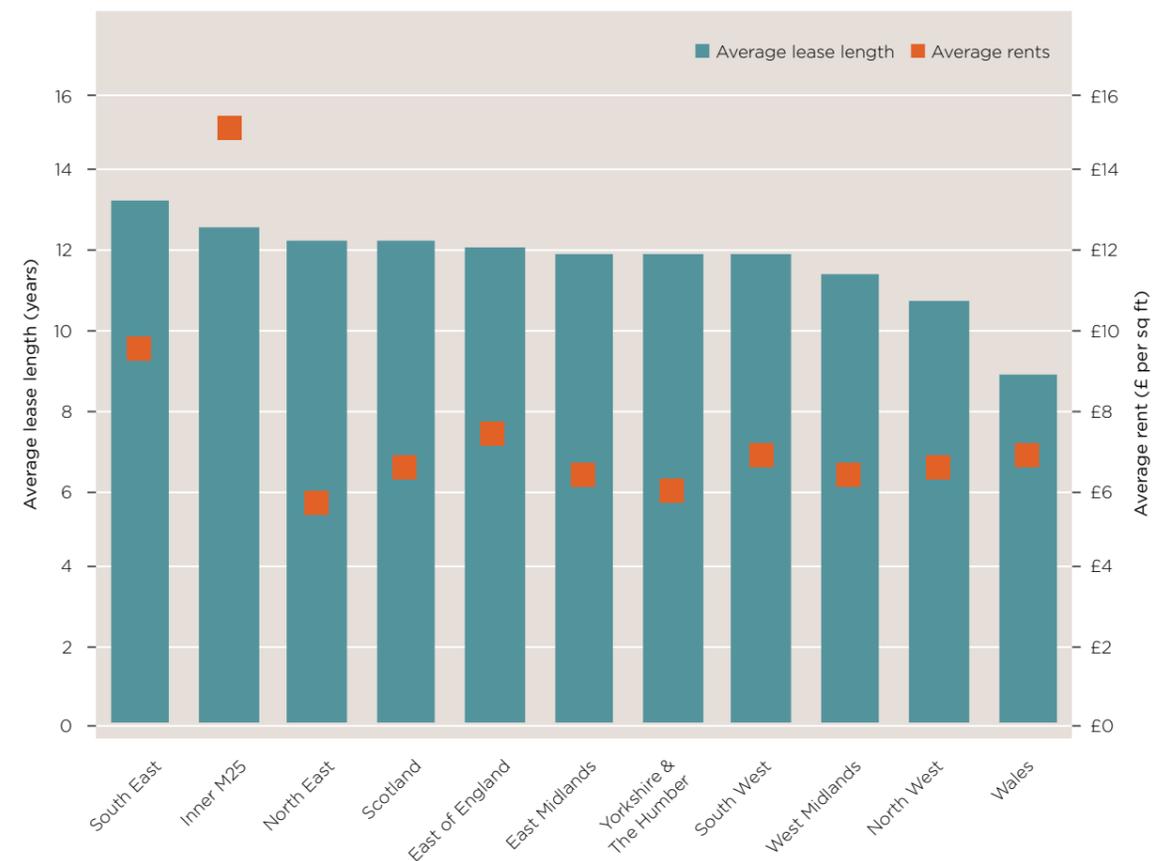
In this instance the most likely route for delivery will be to lease space for a ‘Build to Suit’ (BTS) unit from a mainstream logistics and industrial developer. However, this may have cost implications for the factory operator as the average lease length for a BTS unit in 2019 was 18 years, compared with 12 years for a second hand unit.

A public sector backed industry?

A key enabler of MMC growth will be the award of contracts from local authorities and housing associations to deliver social housing within their boundaries. From a logistics and industrial developer perspective this has the potential to make MMC companies more attractive as potential tenants as their sales pipeline is effectively backed by the state.

For investors in the logistics sector this income is often hard to come by and any buildings with modular house builder as the tenant could therefore become very attractive investments.

Lease lengths and rents by region



Source: Savills Research



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