

Why MMC is failing and how we think we can fix it?

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If you are fans of industrialised construction – as we are – you can't help notice that many of the methods aren't really that 'modern' at all. This includes standardised prefabricated system-based approaches (now dubbed 'platforms')¹.

As we have noted before² much of the focus of the industry is around a narrow ambition for productivity, not a broader sustainability vision (that goes way back even to Egan and Rethinking Construction by the way) and worryingly *'minimal objective evidence-based research that quantifies these benefits'*³.

1: A useful history of some systems is provided in New London Architecture (NLA)'s [Factory Made Housing](#) publication.

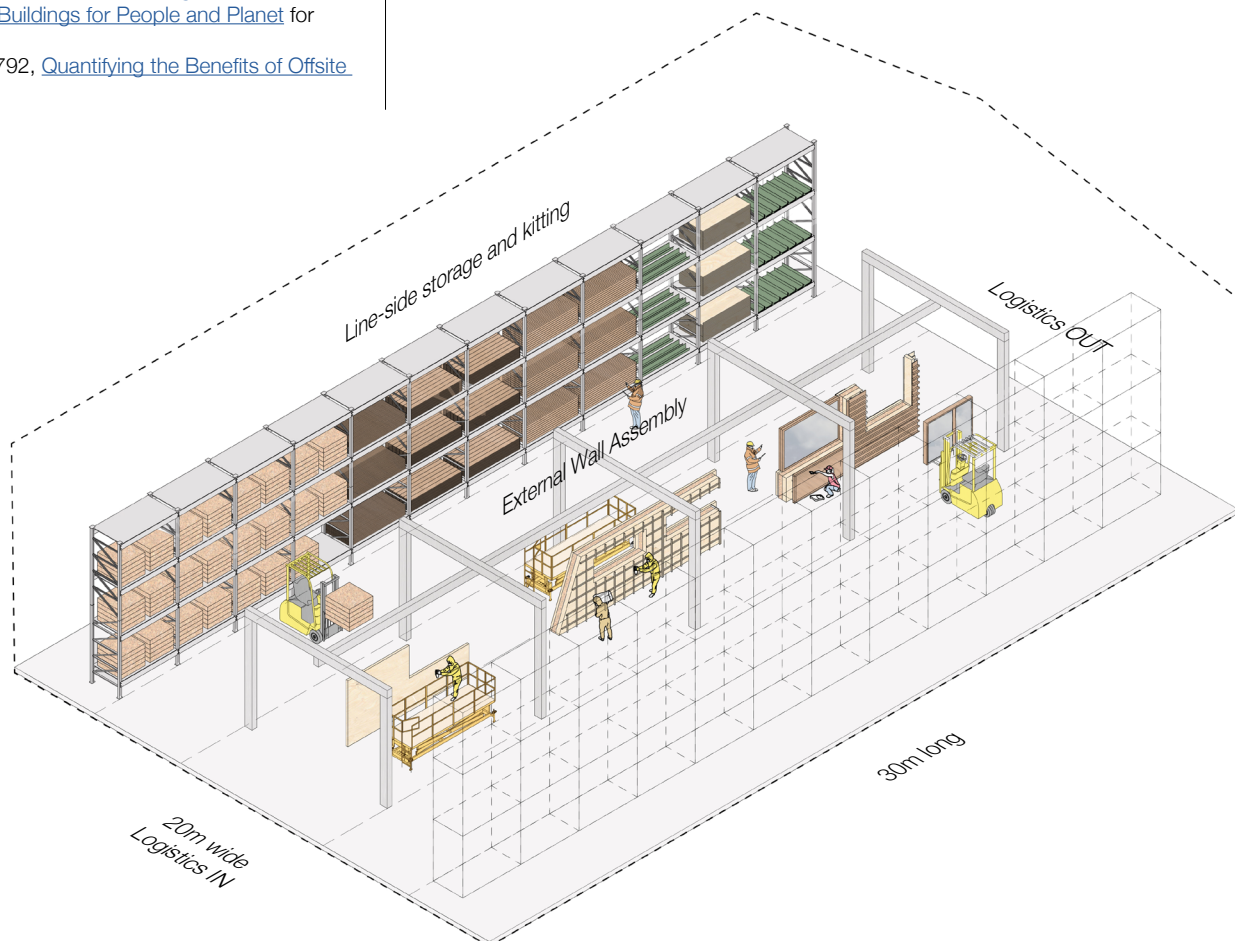
2: See [Manufacturing Buildings for People and Planet](#) for instance.

3: See CIRIA report C792, [Quantifying the Benefits of Offsite Construction](#), 2020

As we were quickly reminded in the Covid pandemic, our world works as an interconnected system. Rather than work with existing supply chains focused on a new agenda for environmental and social value, we seem to be trying to establish separate, disconnected methods based on an out-dated model of efficiency. (Spoiler alert: we now live in a limited not low carbon economy where absolute limits and not just relative improvements are key.)

We propose something else: a distributed model for housing manufacturing, taking the best of emerging industry digitisation and applying this to projects to simulate manufacturing in design. This allows diversification of suppliers, brings work opportunities to communities, and avoids the eye-watering levels of capital investment that are simply unthinkable for many but the largest developers, and discourages smaller builders from adopting new methods, and critically brings design quality back into the delivery agenda.

Below: Layout for the Flying Factory to be erected within an existing or temporary shed only 30m x 20m.



All these car manufacturing analogies miss the point that these businesses are assemblers of components, not actual manufacturers. If we understand and use standardised component information and production constraints in the design process for homes it allows designers to use it, clients to specify it, and the current manufacturing base to supply it, encouraging smaller builders into this market.

For Positive⁺ House, we worked with the wall Cross Laminated Timber (CLT) and open web joist floor manufacturers to understand their production constraints to set the main house dimensions and define our hybrid panellised (MMC category 2) frame and services 'chunk' (MMC category 5) approach. These would come to an on or near site flying factory (sometimes also called a field factory) for final pre-assembly before installation. This avoids all the inherent material and system issues of volumetric (MMC category 1) methods such as required wall stiffness, transport impacts, and possible fire risks of doubling up of wall and floor elements.

We coordinated and packaged all the services into single unit ('chunk') to allow these to come pre-assembled and tested and then placed in the house where the occupant to get easy access to them for maintenance or later replacement.

Yes, there is probably more hand work on site, but as you don't have to the same costs of a permanent factory to offset, the necessity to maximise Pre-Manufactured Value (PMV) is relaxed. We estimated that we are still achieving a PMV of about 77% using this approach while bringing the human element back into building.

Our aim is to adopt the best of digital methods and we are now working on the generative design methods with our colleagues to scope out the methods that will allow near bespoke manufacturing of homes not just mass customisation of the 'trim'.

We aren't saying MMC approaches are somehow wrong, far from it. We just feel they are failing as the ambition that drives them were set for a different time. We need to focus on the manufacturing supply system as it is, include quality and climate aims within design, and use advanced digital methods to improve delivery. Only that way will people recognise MMC is valuable and not just a way to do things on the cheap.

The Positive⁺ Collective.

Below: The 'ingredients' required to construct a 2-storey Positive House laid out as components.

