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The MMC Definition Framework

July 2019

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WHAT IS THE MMC DEFINITION FRAMEWORK?

Addressing inconsistencies in the language used

Offsite manufacturing	Offsite construction
Components	Modular
Full volumetric modular	Smart construction
Precision manufacturing	Onsite innovation
Sub assemblies	Prefabrication
Prefabs	Fabricated
Factory made housing	Premanufacture
Panelised	DfMA

MHCLG MMC Working Group set up in 2018 to address definition of MMC.

Definition Framework published in March 2019.

Seven Categories of MMC – Structural / Non Structural / Onsite / Offsite

Category 1 – Pre-manufacturing (3D)

- Systemised approach of volumetric construction
- Structural units pre-manufactured off site or near site
- Production three-dimensional units
- Variety of forms: basic structure only to fully finished ready to install

Category 2 – Pre-manufacturing (2D)

- Systemised approach using flat panel framing construction
- Structural performance assembled into a three-dimensional structure onsite
- Open panel systems with services, insulation, cladding installed onsite
- Closed panel systems with more factory-based fabrication
- Excludes non-load bearing walling systems such as unitised systems

Category 3 – Pre-manufacturing (Components)

- Non-systemised approach to construction
- Form part of the primary structure as stand-alone components
- Components are fixed and installed on site
- Variety of forms: floor slabs, columns, beams, stair cases, roof structures etc.

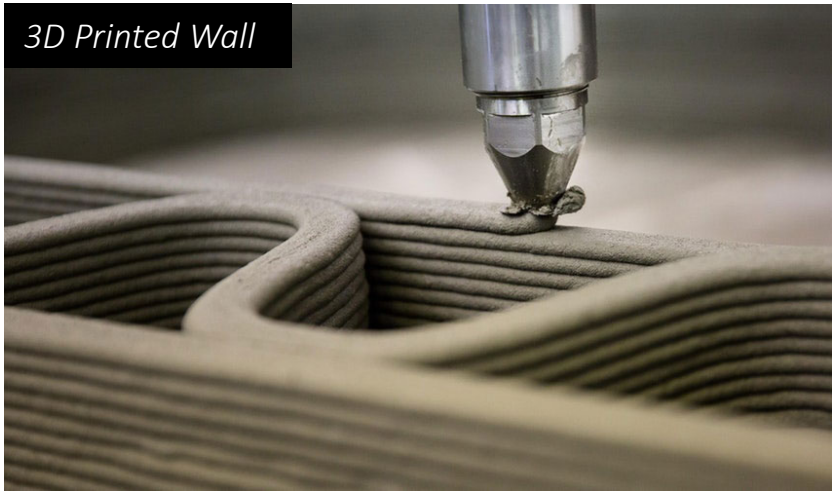
Columns and Beams

Floor slabs

Roof structure

Category 4 – Additive Manufacturing

- Structural or non-structural
- Process of printing parts of buildings using various materials
- Process based on digital design and manufacturing techniques
- Carried out off site or on site
- Variety of forms: structural forms / components or non-structural components



3D Printed Wall

3D Printed Fixing

Category 5 – Pre-manufacturing (Non structural)

- Non structural assemblies and sub-assemblies
- Constructed using volumetric or panelised approaches
- Tend to be used for areas which are more repeatable such as kitchens, bathrooms, risers etc.
- Excludes sub-assemblies such as windows and doors that are fixed onsite.

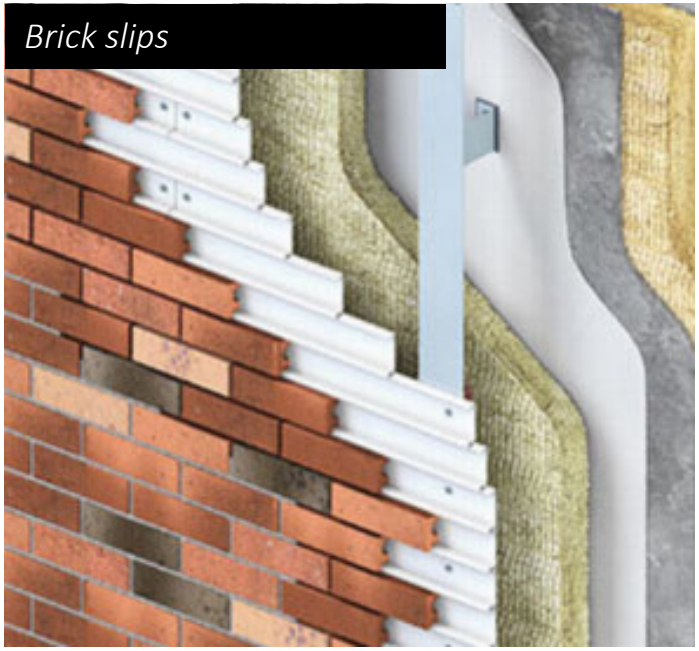
Mini Volumetric Pods

Prefabricated Risers

Pre-wired Distribution Box

Category 6 – Traditional build / site labour reduction

- Concerned with the traditional building product
- Leads to site labour reduction / productivity improvements
- Use of large format / pre-cut configurations to reduce extent of site labour
- Excludes digital-led or automated techniques (covered by Category 7)



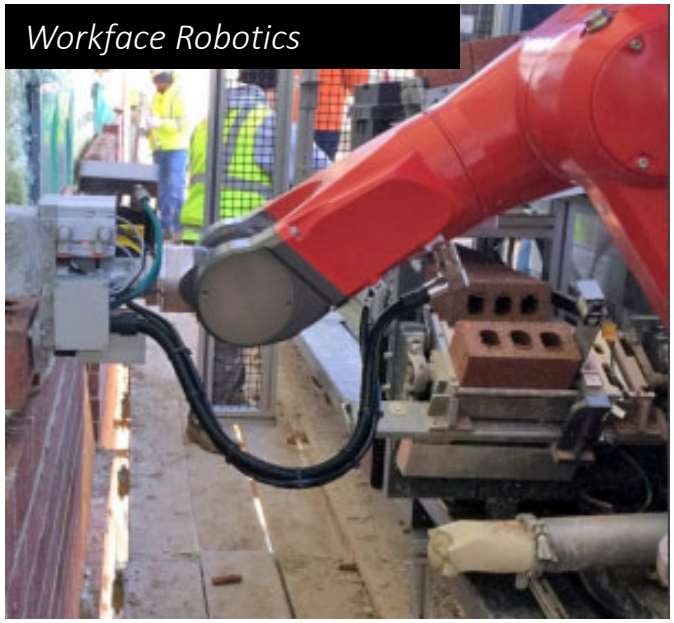
Brick slips

Large format walling

Category 7 – Site process led labour reduction

- Approaches utilising innovative site based construction techniques
- In addition to the use of building products defined in Category 7
- Examples include: lean construction techniques, workface robotics, digital worker augmentation etc.

Workface Robotics



Augmented Reality

What makes it MMC?

- Scale at which categories is been considered over traditional build techniques
- Integrating multiple categories to enhance productivity and efficiencies
- Process / application of a form of material in production or construction
- Level of investment in production processes to enhance quality, productivity and efficiency
- Introducing a digital approach to design – Revit / Inventor
- Wider approach to delivery to retain greater control e.g. construction management, vertical integration or alliancing
- Sustainable approach to development ‘acquisition to delivery to operation’

WHY IS IT IMPORTANT?

- We need a common language to provide clarity
- Engagement and adoption levels are growing
- Need to understand the design considerations for a category
- The number of suppliers is on the rise
- The procurement model can look different to traditional

Five reasons why it is important?

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Cat 1	*3D Primary Structural Systems*		▪ Perceived area of greatest unknown = most intrigue ▪ High level of influence
Cat 2	*2D Primary Structural Systems*		▪ High familiarity ▪ New recognition for open vs close panels
Cat 3	*Pre-manufacturing components*		▪ Perceived area of low level of influence within existing delivery model
Cat 4	*Additive manufacturing*		▪ Little understanding / seen as 'futuristic' ▪ Outside of influence
Cat 5	*Non structural assemblies*		▪ Area of high familiarity ▪ Hybrid approach with Category 2
Cat 6	*Traditional building led reduction*		▪ Perceived area of little client influence
Cat 7	*Site process led reduction*		▪ Perceived area of little client influence

We need a common language to provide clarity

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LOW	MEDIUM	HIGH
Academic research	Speaking at conferences	Market disrupters
Attending conferences	Category 1 or 2	Long term investment
Meeting manufacturers	Researching categories	Diversify / Hybrid categories
Visiting factories	Piloting sites	Committed pipeline
Category 1 (maybe 2)	Confirmed pipeline	Modernised delivery model
Identifying opportunities	Considering delivery model	
Traditional delivery model	Design standardisation	

Engagement and adoption levels are growing

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Category 1

- To retain flexibility in the design process as long as possible 
- To refrain from selecting an MMC Category at the project start 
- To control the architectural vernacular of the building 
- To have the ability to customise the internal specification of a unit 
- To gain efficiencies in materials / components over WLCC 
- 'New wave' To integrate standard typologies from the inside out 

Design consideration in Category 1

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When aligning expectations that impact design developers will need to consider the following points.

Category 2 to 7

1) Do they have the ability to influence a main contractor?
2) Do they have the opportunity to consider an alternative delivery model?
3) Have any standard typologies and buildings been designed using a DfMA approach?
4) Are they able to bulk purchase components or sub-assemblies for a portfolio?

It will be beneficial to develop a standardised approach to design through engagement with the supply chain for each of the MMC categories being considered.

Increase in market suppliers

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Traditional procurement model is based on RIBA Stage 3 full risk transfer (design, price and programme) through a single contracting relationship (warranty provision).

Category 1

- Single contract but limited capacity / experience
- Early engagement without the ability to provide lump sum fixed price
- Design freeze / reduced flexibility
- Tender weighting tends to be towards lowest price on capital cost
- Requirement for upfront payment
- Moving away from project-by-project procurement

Category 2 to 7

- Insufficient value in individual packages to have a single contract
- Ability to influence a main contractor / alternate traditional delivery model
- Categories 6 to 7 can depend heavily on strong onsite management capabilities

THANK YOU