



Member of the SNC-Lavalin Group

Modern Methods of Construction LCC Coffee Club – 24.3.21

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Faithful + Gould and our sister company Atkins are a part of SNC Lavalin - a global fully integrated professional services and project management company



LCC Coffee Club Topics

What is MMC?

Why do MMC?

Where does MMC fit Best?

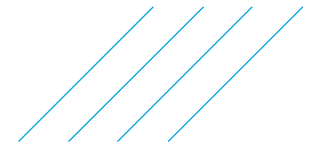
Challenges of MMC?

Examples of MMC in Lincoln

Opportunities for MMC in Lincoln

How F+G can help

Questions



So What is MMC Really?

Modern **Methods** of Construction
should be thought of as
a Process not a Product



What is MMC?

Modern Methods of Construction / Offsite Manufacturing / Modular / Prefabricated / Volumetric / Panelised / Pods / Precast

7 Category Definition

Category 1 – 3D Structural Components – Modular / Volumetric

Category 2 – 2D Large Format Aggregated Structural Components

Category 3 – 2D Standard Structural Components – SIPS, Glulam, Pre-Cast

Category 4 – Additive Manufacturing – 3D Printing

Category 5 – Non Structural Components – Bathroom Pods, Composite M&E

Category 6 – Site Based Material Improvements

Category 7 – Site Based Labour Improvements



What is MMC?

Complete Build

Building Elements



Volumetric
Cat 1 MMC



Large Format Panels
Cat 2 MMC



Components
Cat 3 MMC



M&E Sledges / Pods
Cat 5 MMC

Incremental Offsite PMV % (Pre-Manufactured Value*)

(*Source: PMV from The Farmer Review of the UK Construction Labour Model)



Why do MMC?

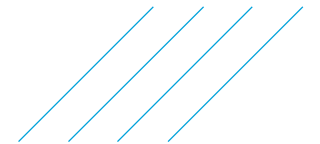
Government Mandate

In excess of £20Bn over next 5 years

It can Solve the Problems of Construction

Can it?

What are those problems?



Why do MMC?

Challenges of Construction

Low Productivity

Poor Reputation

Variable Quality

Labour Shortages

Site Constraints

Environmental Challenges - Waste

Social Value Issues – Dislocation of Need

Implementation of Digital Technologies



Why do MMC?

96% of Volumetric Modular building projects are delivered on time and on Budget.

MMC offers up to 40% reduction in build times

Future Maintenance costs - 30%

Ministry of Defence review | 2013

“With the use of Off-Site Manufacture overall productivity of UK construction industry is increased by almost 2.5 times”

Wajiha Mohsin Shahzad - Massey University: June 2012



Project Benefits of MMC

Speed

- › Limited access times /duration / reduced site prelims / early opening and therefore revenue

Safety

- › Reduced working at height / plant interfaces

Sustainability

- › Fewer transport loads / Lower levels of waste

Quality

- › Controlled Process

Reduced Disruption

- › Occupied / Restricted Sites

Predictability

- › Cost and Completion Date



Other Benefits of MMC

Social Value & ED&I

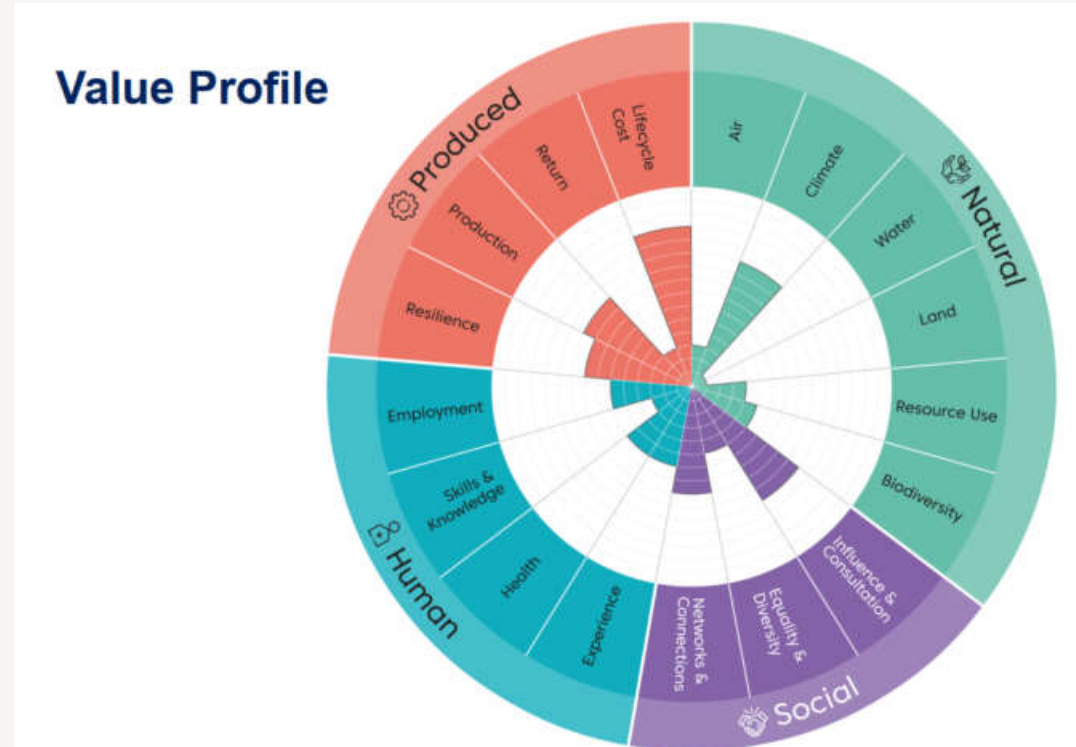
- › Levelling Up Agenda
- › Culture Change
- › Accessibility
- › Consistent Employment

Digital Transformation

- › 7 D BIM
- › Digital Twins

Productivity

- › Materials
- › Labour



Where Does MMC Fit Best?

Category 1

- › Multi Occupancy Accommodation – Hotels, Student, Barracks, Custodial
- › BTR / Social Housing
- › Education
- › Healthcare
- › Rapid Retail

Category 2 – Category 1 +

- › Category 1 +
 - › *Apartments*
 - › *Housing for Sale*

Category 3

- › All market sectors

Category 5

- › All market sectors



The Challenges of take up of MMC by Clients?

Lack of exposure to good practice resulting in lower levels of knowledge and expertise

Lack of impartial information in the front end process

Current delivery model meets statutory obligations and procurement processes

Client reluctance to commit to a supplier early in the process

Lack of confidence in suppliers and systems

Lack of client side guardians to manage the process efficiently

Preconceptions about MMC



Preconceptions - Truth or Myth?

All MMC buildings are basically the same (portacabins)

MMC design is inflexible

The finishes available are restricted

Performance levels are lower than traditional

Design lead times are too long / design freeze is too early

Cash flow is too fast

MMC costs more



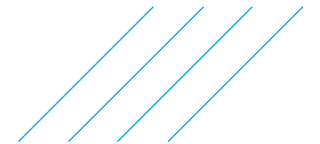
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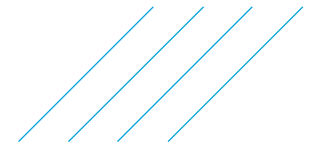
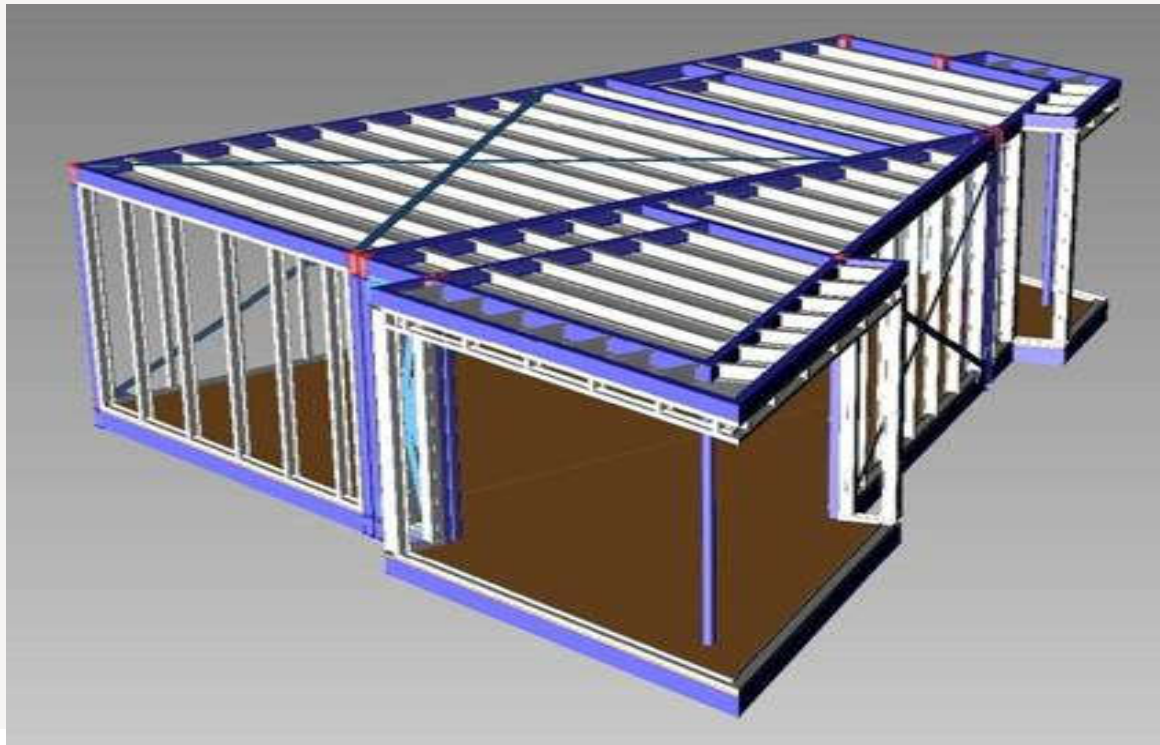


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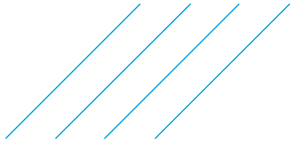
MMC is Inflexible in Design

Slanted / Oval / Sloping / Double Height Spaces are possible



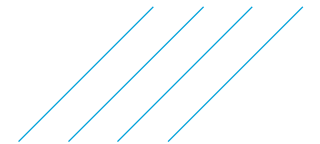
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MMC Restricts the Palette of Finishes

All types of traditional finishes can be applied



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Performance levels are lower than Traditional Building

Structural

- › Designs up 40 storey / Designed to meet specific project criteria

Floor Performance

- › VDV Values – Medical Compliance
- › Deflection – High load floors
- › Material choice

Durability

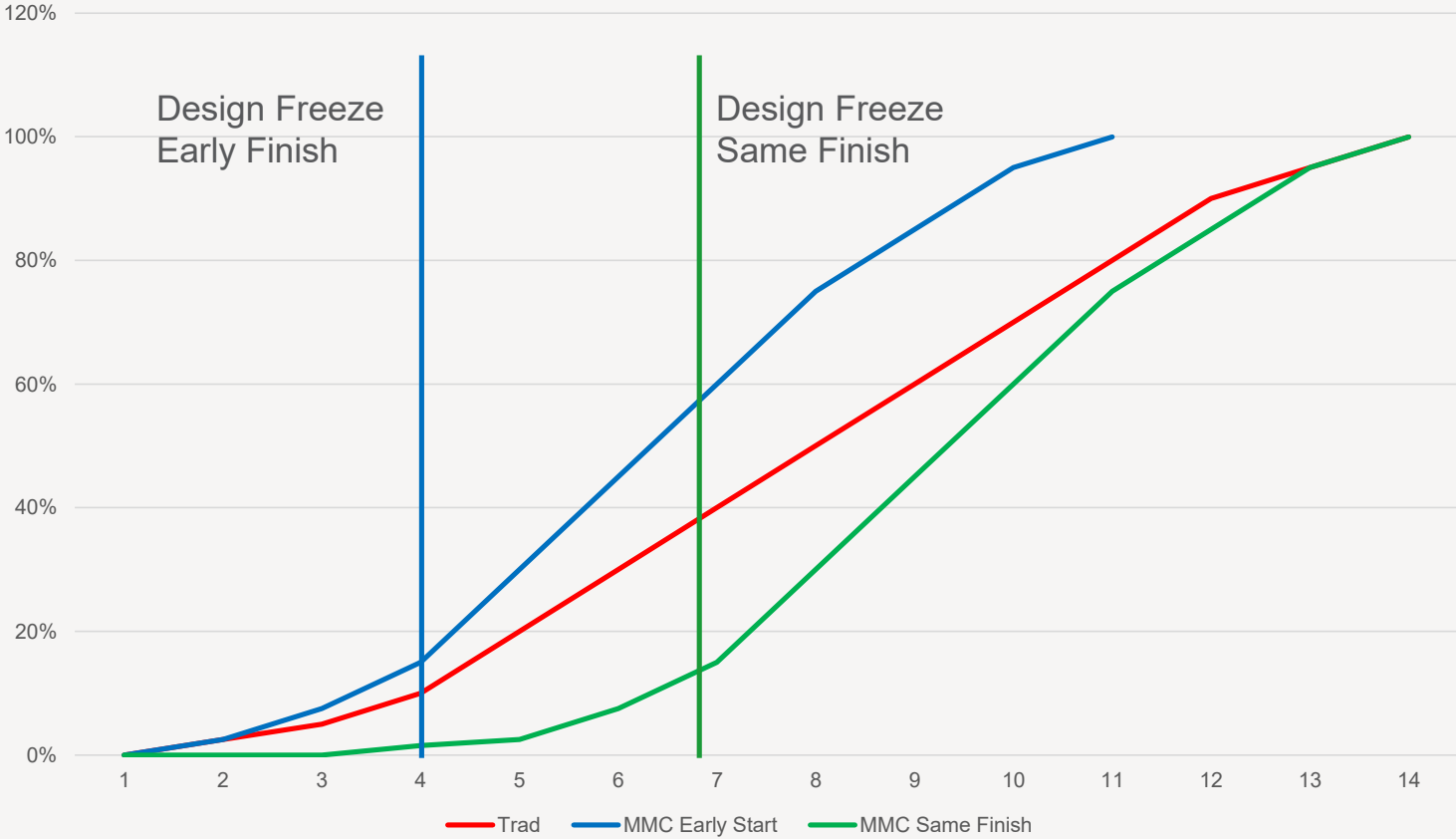
- › 60 / 100 year design life - Dependant upon design and material

Thermal

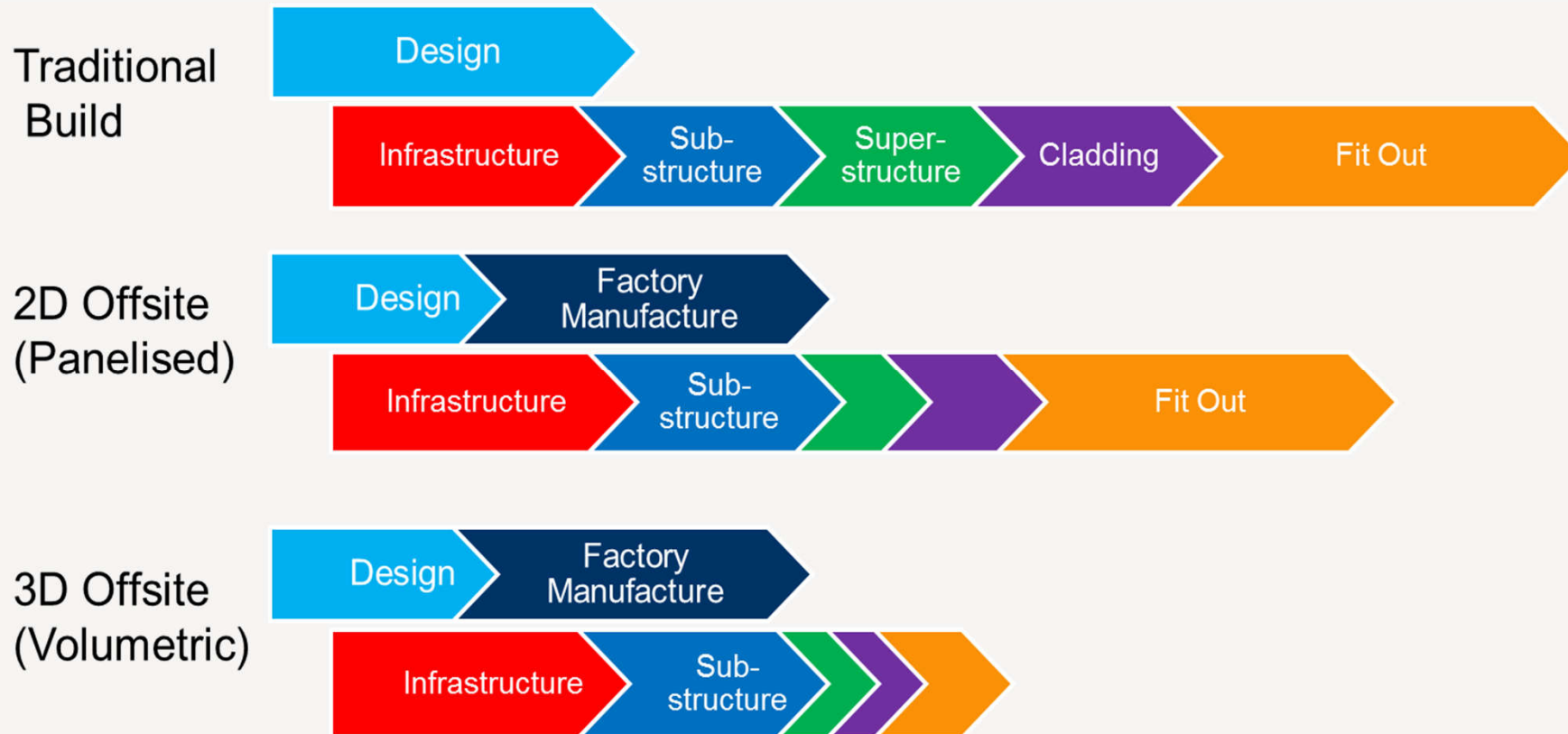
- › Passivhaus standards
- › Net Zero in Use and Embodied Carbon
- › Actually easier to achieve due to detailing and factory quality control



Design is too long - Design Freeze is too early?



Programme – Stacked Activities



MMC Costs More

MMC is more expensive than traditional

Depends upon scheme

Early consideration is key

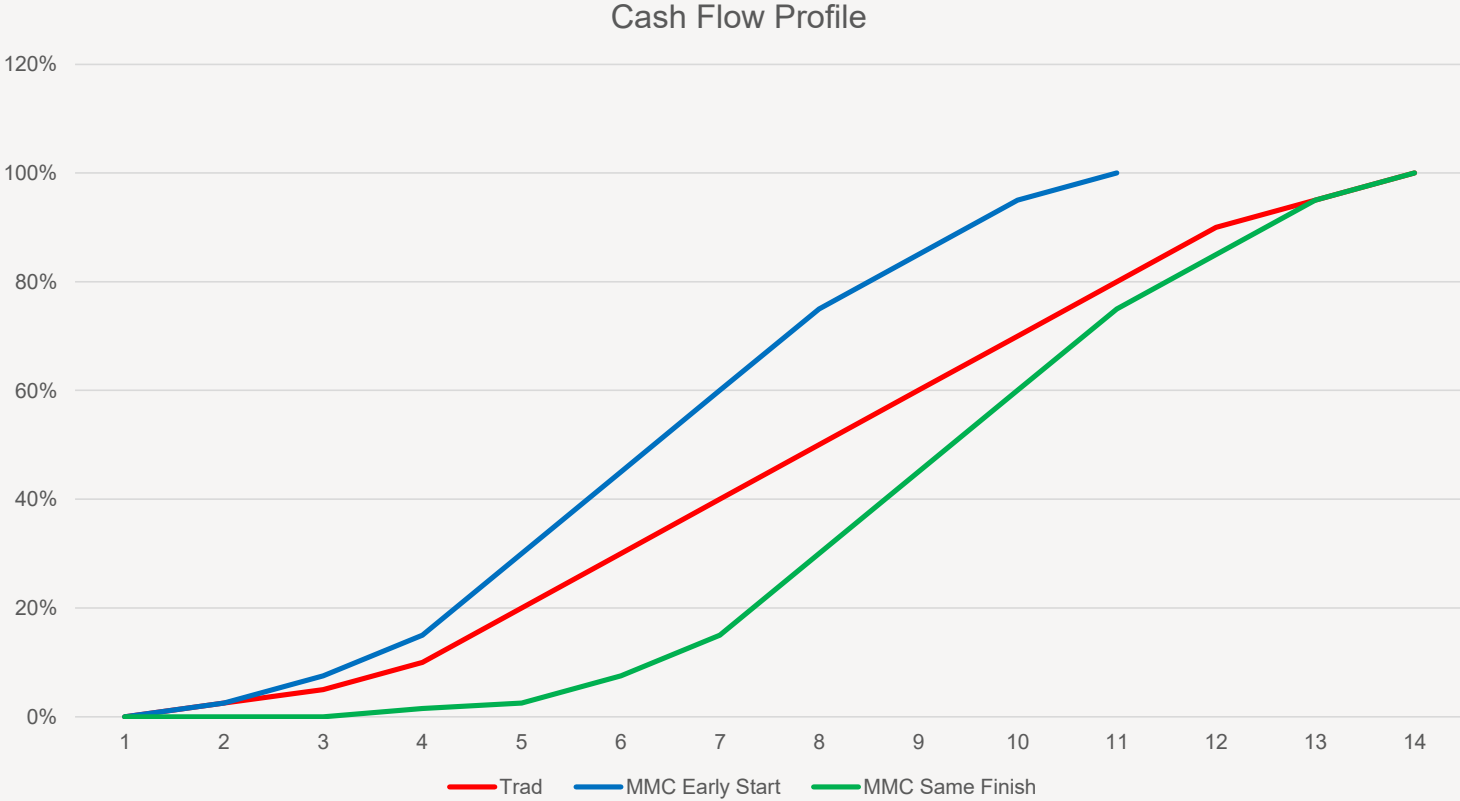
Look at whole costs, including cost of capital and revenue

Cash flow is too high

It is steeper but later compared to completion date.



MMC Costs More - Cash Flow?



Cost

MMC is more expensive than traditional

Depends upon scheme

Early consideration is key

Look at whole costs, including cost of capital and revenue

Cash flow is too high

It is steeper but later compared to completion date.

I will save money by using offsite construction

Where is the saving on a one off project? Factory Efficiency vs one off costs

Why would materials be any cheaper? - Global market

For the right project costs will be at least neutral with the in built benefits of offsite coming for free.

Procurement methodology and good advice is key



MMC – Breaking The Myths

I tried Modern Methods once and they don't work!

Don't blame the brick – MMC solutions offer significant benefits when used correctly on appropriate projects and with good designers, suppliers and contractors.

However, it is as important to know when **NOT** to use it as when to use it.

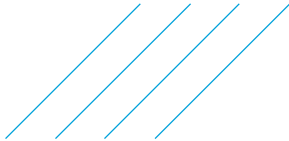
Early consideration is key and does not restrict the options



MMC in Lincoln – BGUC Student Flats, Caledonian, 2013



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MMC in Lincoln – BGUC Student Flats, Caledonian, 2013



MMC in Lincoln – Bridge House, ModularUK, 2003



MMC in Lincoln – Bridge House, ModularUK, 2003



MMC in Lincoln – University Arts Building, ModularUK, 2007



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MMC in Lincoln – University Arts Building, ModularUK, 2007



MMC in Lincoln – Lincoln County Hospital, ModularUK, 2010



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How Does MMC Affect The Client

Pre-Construction

- › Requires a knowledgeable consultant team
- › Early assessment of options and strategy – left of Stage 0

Commercial Issues

- › Payment terms – Offsite Valuations, Vesting Certificates, Cash Flow Profile
- › Contractor Assessment – Size / Factory / Capacity / Storage

Programme

- › Speed of Delivery, Stacked Design Processes, Firm Design Freezes needed

Procurement Methodology

- › Robustness of supply chain and route to market
- › Scope / Split - definitions are important to manage expectations
- › Quality / Test and Inspection Plans – need to reflect where works are taking place
- › Sign Off / Certification / Incorporated Works



Opportunities for MMC in Lincoln

Demand

- › Housing Development – aggregated demand?
- › Healthcare?
- › Education?

Suitability for Factory Operations

- › Location
- › Facilities
 - › *Requirements – land / storage ratio*
 - › *RAF Scampton?*
- › Cost Base – overhead vs transactional cost
- › Skill Sets



How can F+G help with your MMC Journey?

Provide exposure to good practice and increase knowledge and expertise of the potential MMC systems and advantages for projects

Provide impartial information in the front end process

Allow engagement and assessment of MMC options within current procurement model

Remove the need to commit to a supplier or technology early in the process

Assist with developing client strategies for MMC and a process to meet governmental and funding guidelines related to MMC content on a Comply or Explain basis

Act as the client side guardian to manage the process efficiently.

Facilitate links between client and supply chain / potential investors

Provide advice as a “Critical Friend” to all parties in the Pre-Construction process to increase the efficiency and uptake of MMC technologies where appropriate.



MMC Workshop Process

Review of Policy / Project Drivers

- › Record all the project and policy specific factors that will determine the level of MMC options

Analysis of Available MMC Options

- › Review Drivers and Score against Suitability Criteria to identify -
 - › *Primary category options*
 - › *Materials and typologies options*
 - › *Most Applicable MMC Strategy*

Review of Impacts of Options

- › To include impact on Cost / Programme / Risk / Specification / Sustainability

Design Implications

- › Ensuring the maintenance of an open protocol to provide flexibility if drivers change

MMC Options Report

- › Summary of Scoring, Recommendations, Best Fit Solutions, Comply or Explain Statement



Stage 0-2 MMC Design Review

Evaluation of Spatial Arrangements

- › Review openness of base dimensions
- › Review of storey heights, party wall build ups, ground interface details, grids
- › Primary load paths and structural MMC options
- › Determine tolerance build ups and factory / site scope division

Evaluation of Elevation Proposals

- › External Cladding Impacts
- › Fenestration Impacts
- › Review interface areas

General Services Distribution Analysis

- › Alignment of connections / service runs
- › Interfaces / access arrangements

The aim is to maintain an open protocol (where required) to allow a change of strategy with minimal disruption if an external factor changes the MMC mix / need at later stages



Where Can F+G Help

Project Support

- › Project Management
- › Design
- › Cost Management
- › Commercial / CSA / Terms Advice
- › Programme Management
- › Specialist Services
 - › *Strategic Advice / Better Business Case Writing*
 - › *MMC / Net Zero / Social Value / BIM / Digital Engagement*
 - › *Development Management / CDM / Party Wall / Life Cycle Costing / BREEAM*
- › Training / CPDs / External Positioning Opportunities / Education Support

- › Please contact either Stephen Wightman Stephen.Wightman@fgould.com or Jamie Thompson Jamie.Thompson@fgould.com if you need to know more.





Thank you for your attention – any questions?

