

CIC Webinar on DfMA – Facilitating Offsite Construction through a "Platform Approach"

Date: 14 December 2020

Topics and Speakers

Housing Standardisation using Design for Manufacture & Assembly (DfMA)

- Presented by Mr Rory BERGIN
Partner, Sustainable Futures at HTA Design LLP, UK

Integrating MEP Modularisation

- Presented by Mr Mark WATKINS
Managing Director at ECS Engineering and Former Managing Director of NG Bailey Offsite, UK

Due to the limited time, our speakers were unable to answer all your questions during the live webinar. Therefore, we have summarized the most common questions, and you can now check out the answers below.

Questions & Answers

1. How to define P-DfMA for MEP, what are the common platforms for modularisation? Without government support, how do UK stakeholders drive for DfMA MEP?

Rory: The main driver for UK standardisation is coming from project drivers for speed and early completion. UK Gov't has indicated a preference for offsite methods to be used in several UK departments. This is being led by the department for education, prisons, and infrastructure. The UK Housing Agency, Homes England, is mandating a 25% of offsite construction for new housing projects which are Gov't funded.

Mark: https://www1.bca.gov.sg/docs/default-source/docs-corp-news-and-publications/publications/for-industry/mep_guidebook_final.pdf

The above link is a really good document that has some relevance to the Hong Kong marketplace.

The drive for MEP modularisation has come from the MEP contractors. Initially it was driven by a requirement to fill the gaps that an aging workforce will ultimately leave. However, as time as moved on the need for sustained quality, better H&S, programme certainty, cost benefits, speed of install etc. have all come into play. The UK Tier 1 contractors, in the main, never had any "skin in the game" until clients started to ask them about their Offsite capabilities, then they became interested. This is completely the wrong way to go. Everyone needs to be invested in the goal, you need to work collaboratively with each other, share the pain and gain and be prepared for the relationship to last. This is not something built on a one time venture, it is about building something sustainable that will ultimately benefit everyone.

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2. Is it popular in UK to integrate MEP with non MEP elements such as integrated ceiling instead of MEP separated from false ceiling?

Rory: It is more usual to separate the ceiling from the MEP.

Mark: We have trialed this only once with a mixed result. The supply chain needs to be really joined up so the design of each component can be "tweaked" to fit. However, repeatability is key here, no manufacturer can manipulate a known design for a one off project for a small cost. If you get your design nailed as a team, including a large developer, and you can roll out the solution in scale then you could be on a winner. In short it can be done, it has been done but you need volume for it to be truly successful.

3. Do we need 100% well-coordinated BIM model in Design phase before we go to MiC or modular design? If so, we need more time on design phase?

Rory: It is better to do the 100% coordination after the manufacturer is involved, because the way that the manufacturer operates is usually different from how a designer will predict.

Mark: For MEP it is always beneficial to have the services coordinated.

4. Have you been able to measure and monetize the performance improvements associated with using offsite industrialized solutions in a project? If yes, how did you establish the baseline for each benefit?

Rory: We have achieved a 50% improvement on a traditional building contract, reducing contract times from 2 years to less than one year for example.

5. The commentary about value type consistency in MiC / prefabrication appears to show the value of early contractor involvement on MEP installations. Is this a trend being seen?

Mark: Absolutely, clients are definitely engaging earlier and letting the MEP offsite contractor and the MEP designer make the right decisions for the project/projects. Early engagement is key to the success of offsite. If you try to shoe horn an offsite solution in later you will fail, it will cost more and the benefit will not be realised.

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- 6. Are there any light weight substitutes used for formation of modules (e.g.: concrete, timber) for tall structures?**

Rory: We are using hot rolled steel with light gauge steel infill panels generally.

Mark: You can make most horizontal service modules for a high rise solution in either a "Unistrut" like product or a PFC steel. Depending on the anchoring system, risers do not need to be a major structure.

- 7. It shows that once the transfer plate and central core were built, then modular unit can be put in place. Does it require to build other columns and beam on each floor before going up each floor? Can you please share the treatment for the joints between units? Any weather protection to ensure no water seepage?**

If we are talking risers, they can be installed as each slab is laid. You can cap and wrap the pipe ends to mitigate against water ingress. We have also moved to a thin wall stainless pipe work and away from carbon, to further mitigate against moisture damage. The joining pieces are made as site measured spools and delivered to site as and when required. All connections between modules and /or risers are sent as pre made parts from site measures once the modules are installed, this allows for any variation in the fixed position of the product.

- 8. What if the 9m grid modular MEP content are different to each other, will you still recommend DfMA application?**

The grid size is determined by the solution you are proposing, it is not hard and fast. The main criteria is the size of the module you can transport to the project and to the work face. The biggest bangs are always achieved by making the modules as large as these parameters allow.

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- 9. I refer to the prefabrication of Apex House units and the comments about including beds within the units as they were big and difficult to get into lifts etc. How was the issue of replacement of individual elements to suit owner/user safeguarded in the design of the MiC units/modules?**

The beds and other furniture can be replaced via the lift, putting it in the module took the furnishing off the critical path for the commissioning. Equipping 500 student bedrooms through 3 lifts is a logistic headache!

- 10. Could we have a standardized design for a typical tenant unit interfacing with communal area and public area?**

Rory: A standard design is a good ambition for Hong Kong. We are not sure a UK design would directly translate to HK, but HTA would be a good contact to partner with to support the development of HK solutions.

- 11. Are there any good examples on relocatable MiC residential buildings in UK, other than the Ladywell "Pop-up Village" and "Y:Cube"?**

These are 2 good examples that have been delivered. A live project with more scale is Place London, <https://www.londoncouncils.gov.uk/press-release/02-october-2020/first-modular-homes-unveiled-innovative-pan-london-homelessness-scheme> .

- 12. In terms of standardization, is there any study or guidance on the degree of repetition of modular units relating to cost efficiency? Or it does not really matter once it reaches certain degree of standardisation of units' types?**

This depends on individual projects, on a large scale project we would aim for 80% standardisation, there can be variations within that, but aim for 80% to be factory made.

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