Can Modular Construction Deliver Better Homes?
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Agenda

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• The Need to Drive Improvement in Build Quality
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Choice of Primary Structure

- Significant capital investment in new UK manufacturing capacity is evident
- Variety of options being considered in respect of primary structure
- Concerted effort being directed towards securing relevant product assurance credentials
- Key drivers for new entrants the supply-demand imbalance, productivity and build quality
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The Need to Drive improvement in Build Quality

Data from research has revealed the principal reasons why new homes have so many recorded defects:

- A lack of continuity in terms of supervisory / management personnel during construction
- A lack of investment in new talent
- An over emphasis placed on project profit

Source: T Williams (Coventry University)
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General Benefits of Modular Construction

| Managing supply chain | • Full-time employment of permanent workforce facilitating control of labour  
|• Scope to strategically invest in apprenticeships / skills development of full-time employees  
|• Opportunity to directly engage with key providers of materials / components / equipment |
| Quality | • Scope to drive design and build efficiency through rationalisation / standardisation  
|• Opportunity to embed factory inspection and acceptance testing  
|• Scope to deliver higher levels of occupancy comfort and through-life performance of finished product |
| Programme | • Improved programme surety  
| • Reduction in time required to build  
| • Improvement in planning / milestone adherence / reporting disciplines |
| Cost | • Reduction in cost to build by embracing design for manufacture / assembly / installation to leverage productivity  
| • Efficient conversion of development finance |
| Environment | • Scope to optimise use of materials, and fully re-use / re-cycle any waste generated through manufacturing  
| • Opportunity to reduce energy usage to build |
| Health and Safety | • Transfer of operative activity to a controlled manufacturing environment  
| • Scope to reduce risk of construction and maximise use of mechanical handling / semi-automated process technologies |
| Innovation | • Scope for production scalability  
| • Improved potential to control fabric and services build quality  
| • Opportunity to embed continuous improvement via lessons learned |
| Logistics | • Reduction in on-site activities  
| • Reduction in material deliveries to site and personnel traffic to / from site |
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A Change of Emphasis in Design

Construction industrialisation is a process that starts in virtual space:

- Building Information Modelling can help facilitate an improved culture of innovation and collaboration
- Stage 2 Concept Design activity must cover the issue of buildability (i.e. how to build as well as what to build)
- The aim has to be better correlation between design intent and actual building performance

Source: RIBA Plan of Work 2013)
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The Berkeley View on Modular Construction

Potential for offsite to help solve the housing crisis:

• Speed of construction
• Lower cost to build
• Helps to address the skills shortage challenge
• More sustainable approach to construction
• Improved quality of finish and through-life performance

Factors affecting the take-up of offsite:

• Restricts architectural creativity
• Expertise and experience of professional teams in offsite
• Limited number of supply chain options
• Logistical constraints
• Impact on conventional procurement routes
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The Challenge in Defining What Makes A Better Home

The Green Building Council is promoting the case for improved health and wellbeing of occupants of new build homes:

- Provision of natural daylight / sunlight
- Indoor air quality
- Acoustic performance of building structures

CIBSE has produced a Technical Memorandum for improved health and wellbeing of occupants of new build homes:

- Thermal comfort and avoiding over-heating

Berkeley Group aims to build individually designed homes with low environmental impact. For modular construction to ensure this it is imperative that we deliver:

- Quality of workmanship and product fit-out / finish is industry leading and we want to maintain our standards
- Offsite for those projects which are suited to modular construction (i.e. very high rise solutions will remain traditional)
- Tenure blindness (i.e. the customer is not able to discern how something has been built)
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Conclusions

There is no doubt that opportunity exists to transform the process of housebuilding in the UK and we are looking to other sectors, such as automotive, to help gauge the potential. The challenge in addressing the overly risk-averse, non-productive and innovation wary culture that typifies housebuilding in the UK could be considered significant. Lessons can be learned from other sectors as to how to leverage productivity, competitiveness and build quality, so as to directly benefit the potential end-customer with better quality housing stock. Having an understanding of what constitutes quality is key to designing and manufacturing product that will perform and yield improved customer satisfaction.

UK automotive market in 1970s dominated by Ford, Chrysler, British Leyland and Vauxhall

Mid-1970s saw first Datsun product being exported into the UK to challenge incumbents

In 1986, Nissan had opened its first production facility in Sunderland, initially making 100 cars per week

By 2015, the Nissan plant in Sunderland was manufacturing 10,000 cars per week