



Government
Commercial
Function

MODERN METHODS OF CONSTRUCTION

Guidance Note

September 2022

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1. Policy Context

1.1. Overview

- 1.1.1. This guidance note intends to improve and clarify the considerations needed to contract for work delivered using MMC and platform approaches, and to lay the groundwork for future developments as set out in the Construction Playbook.
- 1.1.2. The construction industry plays a vital role in delivering the economic and social infrastructure that underpins UK economic activity and public services. However, the longstanding challenges the sector faces are well known and have been exacerbated by Covid-19. Productivity growth in the UK construction industry is stagnant; since 1997 the annual rate of improvement in productivity has been 21% lower than the wider economy, undermining the value of investments made by both public and private sector clients. The industry faces further challenges with comparatively low levels of capital investment, limited innovation and increasing workforce pressures.
- 1.1.3. The government is committed to using its position as the single largest construction client to support the adoption of a more productive and sustainable business model within the UK construction sector. At the Autumn Budget 2017 the government announced its commitment to Modern Methods of Construction (MMC) through the adoption of a presumption in favour of off-site construction for relevant departments from 2019. This was followed in December 2017 by the publication of Transforming Infrastructure Performance (TIP), which sets out a long term programme to improve the performance and delivery of infrastructure assets. TIP was refreshed in 2021 with the publication of TIP: Roadmap to 2030¹.
- 1.1.4. In December 2020 the government expanded on its commitment via the publication of the Construction Playbook and by setting out specific proposals relating to 'A Platform approach to Design for Manufacture and Assembly (P-DfMA)²'. Following the progress made through collaboration with industry on platform approaches and to support achieving its strategic outcomes, the government is committing to increased use of platform approaches in construction where proportionate and appropriate.

¹ <https://www.gov.uk/government/publications/transforming-infrastructure-performance-roadmap-to-2030>

² <https://www.gov.uk/government/consultations/proposal-for-a-new-approach-to-building-call-for-evidence>

- 1.1.5. There is consensus that some current contracting models will not be as effective in facilitating platform or MMC approaches to delivery, and that different models of contracting and delivery are required. This note builds on Chapter 2 of the Construction Playbook, to provide more detailed guidance for departments on the contractual and delivery elements required to deliver infrastructure and construction projects using platform approaches and MMC. Both the Construction Playbook and TIP set out the government's aim to move towards greater use of these approaches where appropriate. Facilitating this change will require us to change the way in which we work.
- 1.1.6. This guidance note is to aid commercial, legal and project delivery professionals to make these changes to the way they work *in practice*, to deliver using platform approaches and MMC. Its aim is to support departments who are looking to increase the use of off-site construction, by focussing on best practice across a number of examples in the public sector, drawing out contractual considerations, as well as highlighting some of the common challenges faced by the government when procuring for platform approaches and MMC.
- 1.1.7. It is important to note that an MMC solution or platform approach is not always the appropriate choice so should be considered on a case by case basis in conjunction with this guidance.

1.2. **Dissemination**

- 1.2.1. The contents of this Guidance Note apply to all Central Government Departments, their Executive Agencies and Non-Departmental Public bodies. Contracting authorities within the wider public sector are also encouraged to apply this note and its principles.

1.3. **Contact**

- 1.3.1. For complex projects you should consult the Infrastructure Projects Authority (IPA) and the Cabinet Office. The IPA can support contracting authorities in developing their strategic approaches to standardisation and platform approaches via (projectfutures@ipa.gov.uk).
- 1.3.2. The Cabinet Office Markets, Sourcing & Suppliers team (commercial.support@cabinetoffice.gov.uk) provides support to complex outsourcing projects and market insight.

- 1.3.3. Enquiries about this Guidance Note should be directed to the Markets, Sourcing & Suppliers team at markets-sourcing-suppliers@cabinetoffice.gov.uk.

2. Introduction

- 2.1. Modern Methods of Construction (MMC) is a wide term, covering a range of offsite and onsite techniques. MMC provides alternatives to traditional methods and has the potential to deliver significant improvements in productivity, efficiency and quality for both the construction industry and public sector.
- 2.2. The Construction Playbook indicates that contracting authorities should develop a comprehensive strategy at an organisational level. This should run through their portfolios and down to individual projects and programmes.
- 2.3. It is important to stress that MMC is not an end in itself and contracting authorities should consider whether, how and to what extent the use of MMC can drive wider value and achieve the project or programme outcomes. The goal is improving outcomes, such as increasing productivity and efficiency in infrastructure projects, and creating wider social value by using platform approaches and MMC where appropriate. MMC may not always provide the best result.
- 2.4. Appropriate uptake of MMC will help to drive greener, faster, better construction portfolios in the public sector space through:
 - Shared requirements and standards will encourage investment into readily available interoperable components to drive faster delivery.
 - Greater use of offsite construction can deliver efficiencies, higher quality and safer solutions with lower greenhouse gas (GHG) emissions quicker than traditional construction methods.
 - Further embedding digital technologies including the UK Building Information Management (BIM) Framework and digital twins will improve the performance, sustainability and value for money of projects and programmes allowing for building information to be passed effectively and efficiently on from the design team to the facility operator via the contractor.
- 2.5. A joint government and industry working group sought to regularise and refine the term MMC. They published the MMC Definition Framework³, a document that allocates the spectrum of construction techniques into seven MMC categories:

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https://www.cast-consultancy.com/wp-content/uploads/2019/03/MMC-I-Pad-base_GOVUK-FINAL_SECURE.pdf

- Category 1 – Pre-Manufacturing - 3D primary structural systems
- Category 2 – Pre-Manufacturing - 2D primary structural systems
- Category 3 – Pre-Manufacturing - Non systemised structural components
- Category 4 – Pre-Manufacturing - Additive Manufacturing
- Category 5 – Pre-Manufacturing - Non-structural assemblies and sub-assemblies
- Category 6 – Traditional building product led site labour reduction/productivity improvements
- Category 7 – Site process led labour reduction/productivity improvements

2.6. The Construction Innovation Hub's Platform Rulebook⁴, published in May 2022 defines 'product platforms' as:

- The kit of parts, associated production processes, knowledge, people and relationships required to deliver all or part of construction projects using a platform approach.
- A product platform provides a stable core which is configured and combined with complementary components (via defined interfaces) to suit a particular project.
- A product platform also includes the processes, tools and equipment required for assembly.

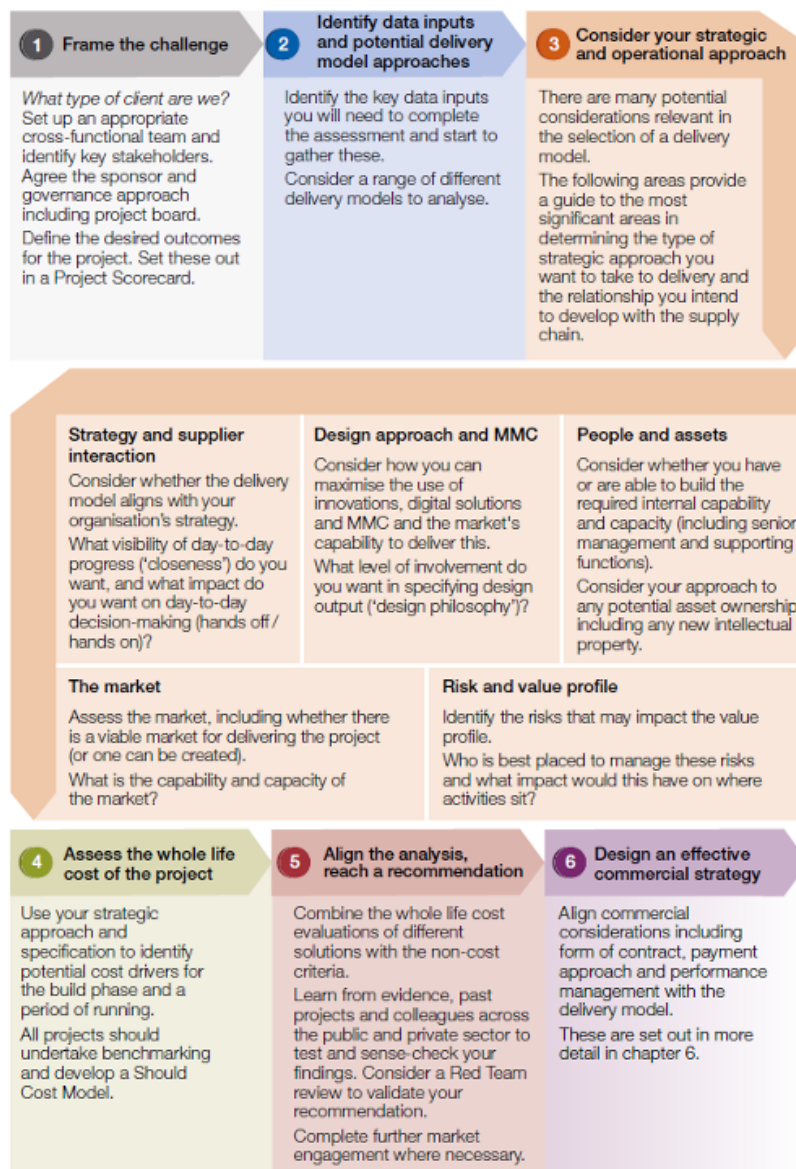
2.7. A platform approach is not an alternative form of MMC, and might involve using some, all, or none of the construction solutions from the seven categories in the MMC Definition Framework.

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https://constructioninnovationhub.org.uk/wp-content/uploads/2022/05/CIH_The-Product-Platform-Rulebook_Con sultation_May2022.pdf

3. Considerations for assessing the use of platform approaches and MMC solutions

- 3.1. A Delivery Model Assessment (DMA) is an analytical, evidence-based approach to reach a recommendation on how a contracting authority should structure the delivery of a project or programme. Chapter 5 of the Construction playbook focuses on DMAs, highlighting that the right delivery model approach enables clients and industry to work together to deliver the best possible outcomes by determining the optimal split of roles and responsibilities.
- 3.2. **Figure 1.** Delivery Model Assessment for public works projects and programmes from the Construction Playbook⁵.



⁵ <https://www.gov.uk/government/publications/the-construction-playbook>

3.3. The aim of this guidance is to improve and clarify the considerations needed to contract work delivered using MMC and platform approaches in order to reach recommendations for a commercial strategy. Combined with analysis and whole life costs of your project/programme, the content of this overlay proposes questions and examples that will help to inform your DMA.

3.4. It is important to understand the full breadth of drivers that inform your strategy and the whole life value of your project/programme in order to understand how aligned different potential delivery approaches are with your desired outcomes. The rest of the chapter expands on five key strategic and operational areas:

- Client;
- Project/Programme;
- Design;
- Market;
- Data.

3.5. **Client**

In framing the challenge for MMC and platform approaches establishing *what type of client we are* can help assess the initial suitability of an MMC approach. The following situations are likely to lend themselves to the use of MMC or platform approaches:

- Where the contracting authority is a multiple project, rather than a single project, client. Benefits will compound if they can be applied across multiple projects.
- If you anticipate, or can move towards, a more centralised rather than localised design where the core content will be developed centrally.
- If there is an opportunity to create a longer-term partnership, incentivised through performance metrics, then investing time into developing a platform approach may be more appropriate than in the case of a transactional buy.

3.6. **Project/Programme**

Those projects/programmes that are of longer duration and greater scale generally have increased likelihood of being suitable for an MMC or platform approach as their scale enables the required investment in early planning and supply chain involvement, a key tenet of these approaches. However, projects can be suitable for an MMC or platform approach when they are short term. Whilst not exhaustive, the following scenarios are more likely to lend themselves to the use of MMC or platform

approaches:

- Where there is a high level of overlap in terms of function and content across projects, and the extent to which assets conform to sector specific output specifications and briefs such as standard grids and room types.
- Where the scale of the project or programme is larger, and the longevity and duration of the project or programme is greater.
- Projects where the technical specificity and engineering variation is consistent and compatible with an MMC approach. For example, highly complex mechanical, electrical and plumbing (MEP) requirements may lead to reduced benefits of an MMC approach, if retrofitting or on site changes are required.
- Where, as informed by the DMA, the contracting authority wishes to retain a large amount of control. The greater a contracting authority's level of control, the greater value can be realised but the greater the level of risk that needs to be controlled (see section on Risk Allocation in Chapter 7 of the Playbook).

3.7. Design

When assessing your organisation's strategy and your desired level of interaction to deliver effective solutions more efficiently, it may be useful to consider the following questions and prompts which show scenarios that are more likely to lend themselves to the use of MMC or platform approaches:

- Where can you identify commonalities and repeatabilities? Highly complex projects may require more bespoke approaches. The degree of commonality across projects will dictate the granularity of standardised solution(s) relevant to the project or programme. This in turn will mean that the degree and scale of commonality will dictate economies of scale and procurement routes.
- Where there is a degree of commonality across programmes: The Construction Playbook already states that contracting authorities should seek to identify opportunities for common solutions across programmes. That should be a key consideration in developing delivery.
- Where asset(s) naturally adhere to their sector's standard approach.
- Where an MMC approach can minimise the double handling of commodities: construction commodities can very quickly be increased by unnecessary handling.

- Where a project requires high integration of cost-dense products with low-cost commodities, a platform approach allows a high degree of integration of interfaces to retain high-cost density zones between usable spaces. Where work is to be carried out offsite, the additional costs should be offset by maximising cost density and compressing functionality into minimum volume, ‘packing’ as many interfaces and trade overlaps into the smallest product possible.

3.8. **The market**

When assessing the market for your project/programme the following scenarios are more likely to lend themselves to a MMC or platform approach:

- Where there is potential for asset(s) to be harmonised and standards or solutions to be shared with other clients or sectors.
- Where a project or programme has high, or critical, cross-sector relevance.
- Where the market already exists and is in a mature state. This will enable early engagement with the supply chain.
- Where there is a need for the market to develop new products or solutions to deliver the efficiency and effectiveness required.
- Where there is an opportunity to create a market for lower carbon solutions.
- Where there is potential for application beyond the immediate project or programme.

3.9. **Data**

When establishing how the project or programme needs to handle data, and its reliance on it, the following situations are likely to lend themselves to an MMC approach:

- Any project or programme that demonstrates the potential to develop a digital library. This would be stored in an open access, central digital location, which combines the standardised requirements:
 - standard space types;
 - critical adjacencies and operational flows;
 - spatial clusters for common configurations;
 - sets of rules regarding interfaces;
 - technical requirements and standards e.g. tolerances, load, thermal

performance and energy efficiency technical standards;

- rules around interoperability.
- If there is potential to create a digital configurator. A data library can then be embedded into a configurator: a digital web-based app/software, which would apply the data to automatically generate anything from a schedule of room types to a full, digital asset model.

4. Contracts for Modern Methods of Construction: a new way of thinking

- 4.1. Different MMC solutions and platform approaches will require different contracting models and ways of thinking. Traditional contracts have developed in a manner that suits traditional methods of construction, where every element of that project is developed incrementally. Design continues to evolve at relatively late stages of the project, including after construction has commenced. MMC and platform approaches require product-led thinking, an increased fixity of design and earlier decision-making associated with manufactured elements.
- 4.2. The following table lays out a hypothetical project and contrasts delivery between: a *traditional* approach to construction; approaches focused on substantive use of offsite and/or volumetric construction which are termed *MMC*; and the use of *platform* approaches:
- *Traditional* sets out the current position using typical contracting norms.
 - *MMC* refers to a delivery approach which includes offsite construction methods but often still relies on the contracting authority procuring a single Tier 1 contractor. This often occurs with dependence on a single manufacturer as a subcontractor because the manufactured elements usually remain relatively bespoke to the particular project or manufacturer.
 - *Platform* describes an approach leveraging a kit of parts that are standardised and rationalised, alongside complementary components via defined interfaces, delivered via defined processes. This ultimately provides greater assurance around quality, value for money and a supply chain's ability to invest in innovation and improvement as a result of greater predictability and volumes.

Traditional	MMC and platforms
Structuring: Contracting and delivery models	
The Tier 1 contractor is appointed under a main contract.	Consider the manufactured elements of the project as part of the initial assessment. Where these constitute a significant element of the project, either in value or in project criticality, consider the benefits of:

The manufacturer is then selected later in the project lifecycle by that Tier 1 contractor.

This can mean that time, cost and/or quality opportunities that can only be identified by the manufacturer are partly or fully missed.

The contracting authority's influence over the choice of manufacturer is minimal as its influence may be limited to ratifying the Tier 1 choice because of programme pressures.

- Ensuring that the procurement of designers and other client team members and their scopes are aligned to early design fixity for manufactured elements.
- Early supply chain engagement with the manufacturers, but recognising the need for this to be proportionate to their capacity for such efforts.
- Appointing the manufacturer directly (see further detail below)

Potential advantages could include:

- Economies of scale available across a programme, portfolio or cross-department procurement.
- Consistency of product supply.
- Direct dialogue with a key supplier to enable fuller understanding of key project risks and therefore facilitate early risk mitigation.
- Supporting manufacturer innovation and progress towards Net Zero by giving the manufacturer adequate certainty of work volume to invest in innovation.
- Collection of data at manufacturer level, supporting the collection of metrics.
- Direct accountability of the manufacturer to the contracting authority.

A platform approach could ultimately yield more significant advantages than MMC. Possible contracting approaches could include a Tier 1 or an integrator led approach. Further details on these specific approaches are outlined below:

Tier-1 Led Approach	
Type of contract	Explanation
A <u>project-specific contract</u> to enable the identification of design elements that are required to be fixed, to support manufacture and/or early orders to be placed, in order to de-risk the project schedule.	This is more at the 'reactive' end of the procurement spectrum to address a more immediate issue for a single project. It is therefore more aligned to MMC.
A <u>multi-project call-off contract</u> , for example through (1), appointing a single manufacturer for a programme of work, or (2), appointing more than one manufacturer under a framework arrangement for a programme or broader portfolio. Consider opportunities to collaborate across departments as this increases the opportunity	This structure could be used for either MMC or platform approaches. Such cross-departmental collaboration could be facilitated best through option (2). A cross-department procurement could be undertaken, but this may be considered too complex. An alternative first step could be for the contracting authority to

	<table border="1"> <tr> <td data-bbox="464 152 943 947"> <p>to realise the advantages noted above and also for the contracting authorities to leverage their buying power to improve the manufacturer's performance.</p> </td><td data-bbox="943 152 1422 947"> <p>appoint alone, but to ensure its procurement notice and framework terms contain enabling provisions to allow other departments to use the call-off process. This could benefit the original contracting authority through greater buying power, the other department through rapid access to a supplier and the supply chain through greater work volume.</p> <p>A differing procurement route could be used under which the contracting authority appoints the manufacturer separately to the Tier 1, but this will result in interface risk resting with the contracting authority.</p> </td></tr> <tr> <td colspan="2" data-bbox="464 947 1422 1171"> <p>Note in both these cases it is critical that the manufacturer has a legally binding obligation to novate its contract from the contracting authority to a Tier 1 contractor in due course, assuming the contracting authority requires the Tier 1 to hold single point responsibility for the overall scope.</p> </td></tr> </table> <p>OR</p> <table border="1"> <tr> <th colspan="2" data-bbox="464 1261 1422 1328">Integrator-Led Approach</th></tr> <tr> <th data-bbox="464 1328 943 1395">Who acts as integrator?</th><th data-bbox="943 1328 1422 1395">Explanation</th></tr> <tr> <td data-bbox="464 1395 943 2067"> <p>If the manufacturer were to comprise the great majority of the scope and/or risk then it may be that a <u>consultant or contractor could act as the 'Integrator'</u> for the various manufacturing supply packages and other supply chain agreements.</p> <p>This is similar to a traditional procurement with coordination by an overall project or programme manager either as a separate consultancy appointment or as an integrated project management</p> </td><td data-bbox="943 1395 1422 2067"> <p>This would be suitable for platform approaches.</p> <p>The multi-project call-off contract as described in the table above would be one way to procure the necessary manufacturing expertise.</p> </td></tr> </table>	<p>to realise the advantages noted above and also for the contracting authorities to leverage their buying power to improve the manufacturer's performance.</p>	<p>appoint alone, but to ensure its procurement notice and framework terms contain enabling provisions to allow other departments to use the call-off process. This could benefit the original contracting authority through greater buying power, the other department through rapid access to a supplier and the supply chain through greater work volume.</p> <p>A differing procurement route could be used under which the contracting authority appoints the manufacturer separately to the Tier 1, but this will result in interface risk resting with the contracting authority.</p>	<p>Note in both these cases it is critical that the manufacturer has a legally binding obligation to novate its contract from the contracting authority to a Tier 1 contractor in due course, assuming the contracting authority requires the Tier 1 to hold single point responsibility for the overall scope.</p>		Integrator-Led Approach		Who acts as integrator?	Explanation	<p>If the manufacturer were to comprise the great majority of the scope and/or risk then it may be that a <u>consultant or contractor could act as the 'Integrator'</u> for the various manufacturing supply packages and other supply chain agreements.</p> <p>This is similar to a traditional procurement with coordination by an overall project or programme manager either as a separate consultancy appointment or as an integrated project management</p>	<p>This would be suitable for platform approaches.</p> <p>The multi-project call-off contract as described in the table above would be one way to procure the necessary manufacturing expertise.</p>
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	<p>organisation as part of the contracting authority team.</p> <p>Potential procurement models could include construction management, management contracting and Engineering, Procurement and Construction Management if the Integrator is not to hold single-point responsibility for the project.</p>	
	<p>Ultimately, it may be that the lead <u>manufacturer could assume the role as the Integrator</u>. This would be more applicable where the manufacturing element does not only comprise the great majority of the scope (as above) but also is largely concentrated with one manufacturer.</p>	<p>This would be suitable for platform approaches.</p>
	<p>Note having the lead manufacturer as the Integrator is not currently a common procurement approach and so careful consideration of appropriate competencies and capacity would be needed.</p>	
Traditional	MMC and platforms	
Time and Money: Long-Lead Items		
<p>Whilst standard forms can allow for long-lead items (e.g. Listed Items in the JCT form), often these options are not identified early and included in the contract. As such, contracting authorities may not be adequately protected.</p>	<p>Ensure provision is included to enable early booking of manufacturing slots and early identification and procurement of manufacturing elements.</p> <p>Manufacturing typically demands payment of a sum to secure a manufacturing slot and incremental payment before the relevant product has been incorporated into the works. Any such payment should be adequately secured. This would include vesting certificates, but these only secure tangible assets, not the period before the asset has been manufactured. Other forms of security could also be used, for example, advance payment bonds if the manufacturer wants the benefit of earlier payment. Likewise, where the payment is not made direct to the manufacturer, the contracting authority could ensure that the full payment is received by the manufacturer and is not retained at the Tier 1 Contractor (or Integrator if relevant) level.</p> <p>Consideration should also be given around more detailed inspection, quality assurance and audit rights over manufacturing facilities. In essence, the 'site' for an MMC project includes the manufacturing facility and other relevant locations e.g. logistics/consolidation centre, not only the project site itself.</p>	

Time and Money: Change	
<p>Scope changes can be made by the contracting authority at any time.</p> <p>However, note that manufacturing requires all elements to be fixed before going into production. Late change by a contracting authority can therefore be costly and cause delays. Contracts do not specifically identify this and so these significant impacts can be unclear until it is too late to reverse the instruction.</p>	<p>Require the contractor to identify critical activities and dates in its programme to support an efficient manufacturing process.</p> <p>Require the contractor to have achieved design freeze for identified manufacturing-related elements by a specified point in time.</p> <p>Require the contractor to provide rapid notice and early warnings of any event that is likely to disrupt the manufacturing process, including potential changes instructed by the contracting authority. Some traditional contracts already contain provisions for detailed programmes and early warnings, however focus needs to be given specifically to MMC in relation to these challenges.</p>
Traditional	MMC and platforms
Quality: Product	
<p>Clauses typically refer to materials needing to be of satisfactory quality.</p>	<p>Consideration needs to be given as to whether product guarantees are available. It is important to ensure that products have appropriate quality accreditation and have been factory tested before delivery to avoid the need to return and replace.</p>
Quality: Intellectual Property	
<p>Intellectual property developed during the project may be owned by the contracting authority.</p>	<p>The intellectual property in the products usually remains owned by the manufacturer and provision should be included in the contract which states the Tier 1 Contractor (or Integrator) will not seek an assignment of it.</p> <p>However you will need to reconsider how IP is owned. The approach to IP may be assisted by developing elements which are so valuable to a project or programme that they should be 'owned' by the contracting authority, and which are 'products' that should be bought as such from the market.</p> <p>Note that IP ownership can vary by contract and may be driven by project/programme considerations. As an example you could consider three levels of ownership and risk:</p> <ul style="list-style-type: none"> • Elements that are readily available from the market;

	<ul style="list-style-type: none"> • Elements that require detailed design and significant integration; • Elements that the client will own and control, for example this could be prototyping.
Quality: Insurance	
There is insurance for loss or damage to materials and cargo.	<p>Insurances exist in line with traditional contracting but it is important to ensure that insurances also address loss or damage to work in progress or completed at the manufacturing facility.</p> <p>Contracting authorities should consider how insurance requirements might vary where they are contracting directly with manufacturers or with the Tier 1 contractor/integrator. Contracting authorities should also consider the use of project or programme wide insurance to cover all parties that could create benefits in terms of economies of scale and through avoiding gaps in insurance cover.</p> <p>Assess whether product liability insurance may be available.</p>

5. MMC Best Practice Case Study 1: SEISMIC Design for Manufacture and Assembly

5.1 Introduction

- 5.1.1 This case study covers the SEISMIC product platform for delivering low carbon buildings. SEISMIC is a system for delivering buildings that was developed and demonstrated through two projects supported by the Transforming Construction Challenge, funded by UK Research & Innovation. It is a modular product platform based on standardised component parts, manufactured to a standard set of design rules in relation to dimensions and interfaces. These components have been designed to be part of a flexible system that can be used to deliver a range of buildings, initially focusing on schools, but the platform could also be used to deliver offices, healthcare facilities, residential accommodation and retail. SEISMIC is designed to be faster to deliver than 2D hybrid MMC construction, or 3D Volumetric MMC construction.
- 5.1.2 Summary of Approach and Planned Outcomes:
- A 47% improvement in whole life value compared to traditional construction methods.
 - A 75% reduction in time to deliver the project compared to traditional onsite construction, and 35% quicker than 3D Volumetric MMC construction.
 - A 70% reduction in whole life carbon emissions, through reduced waste, improved building heat and energy performance and the recyclability of the components.
 - An 80% reduction in the number of Health & Safety incidents, compared to projects built using traditional techniques, with much of the build taking place in specialist manufacturing facilities.
- 5.1.3 It is designed to be consistent with the DfE strategy for decarbonising schools, and the development of a consistent set of design rules for net zero schools.

5.2 Design

5.2.1 The SEISMIC product platform was designed by a consortium from across the construction supply chain, including the contractors McAvoy and Elliott, consultants Blacc, the architectural practice Bryden Wood, and Tata Steel, supported by the Manufacturing Technology Centre and the National Composites Centre, both part of the High Value Manufacturing Catapult, and the Active Building Centre. This combined expertise has enabled the development of a digitised product platform that can accelerate the design and delivery of construction projects. The key benefits of this approach are:

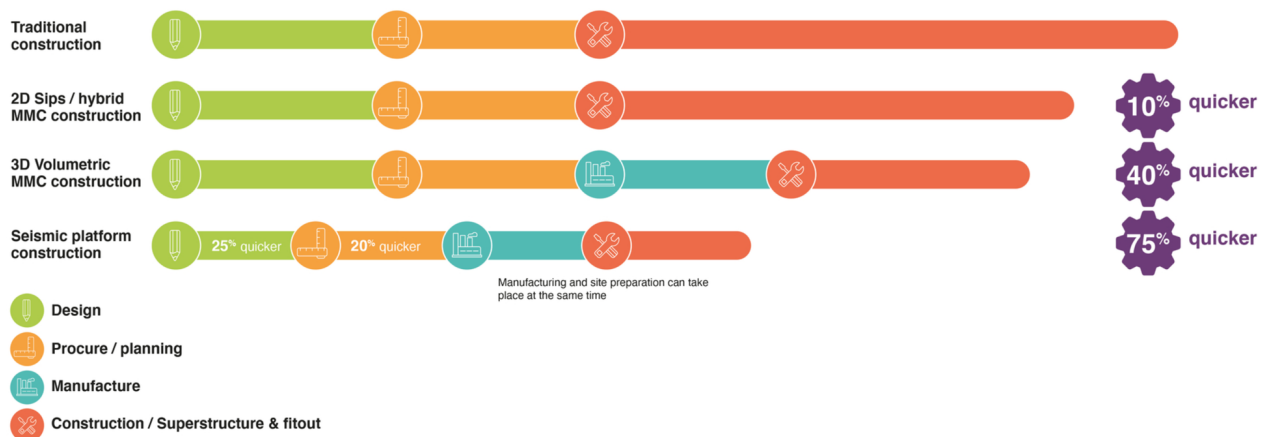
- The design was developed through a collaborative R&D project involving firms from across the supply chain, as well as technology and innovation centres that utilised expertise developed in other sectors and applied this to construction.
- The platform-based approach, supported by a digital modular build design library for schools reduces the design time required by 25% compared to other forms of MMC. Standard elements can be easily repeated, freeing up time to focus on the areas that add the most value to the design.
- All components are designed, then precision engineered, manufactured and tested to exacting quality standards, and to deliver high energy and thermal performance. A test building using the whole system has also been installed and tested at the BRE in Watford.
- Because modules are designed to minimise materials use, there is little wastage during production, assembly and on-site construction. 95% of the steel frame can be recycled, 20% of the other materials used can also be reused, and 40% fully recycled. It is estimated that only 10% of the products and materials used will become waste, mainly insulation products and sealants.

5.3 Project Delivery

5.3.1 SEISMIC offers a number of advantages compared to both traditional onsite construction techniques, and also early generations of modular offsite construction. It can accelerate the time taken to deliver projects, improve supply chain resilience, greater flexibility for repairs and refurbishments, as well as providing for full traceability of the components used.

- The platform-based approach means clients can source components from, or even use, multiple manufacturers to produce component parts for the same project, increasing supply chain resilience and reducing delivery and schedule risk.
- As manufacturing technologies are developed, the standard design of the platform means that improved components or materials can be incorporated easily, improving performance. New components can also easily be incorporated into existing buildings to expand or repurpose them.
- Site preparation works take place in parallel with the manufacturing process, saving time.
- Every component is tracked, tagged and linked to a 3D model so it is fully traceable, making for a safer, easier to maintain building.

5.3.2 Project Delivery Timetable: SEISMIC compared to traditional construction and modular



5.3.3 The SEISMIC platform will be used by Elliott to deliver Phase 2 of the Lawrence Calvert Academy in Leeds, a £27m secondary school development which will use 192 SEISMIC modules, with production starting in June 2022. There are a number of other school projects that will be delivered by McAvoy and Elliott which are also planning to utilise the system.

5.4 Resources

5.4.1 <https://tc-catalogue.strongerstories.org/stories/seismic-i/>



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