



Understanding Offsite: Design

A Guide for trainers



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Introduction to this Course

Introduction to the Offsite Skills Project

The Offsite Skills Project was developed by the Supply Chain Sustainability School, in partnership with the Manufacturing Technology Centre (MTC) and National Open Colleges Network (NOCN) and with funding from the Construction Industry Training Board (CITB). The project is divided into six courses: Design; Procurement; Quantity Surveyors and Cost Consultancy; Logistics; Project Management and Site Management. All the courses provide the fundamental content required to help professionals better understand what they need to do differently when adopting offsite construction techniques.

Course Aims

Purpose: To educate participants on the requirements needed for successful design for manufacture and assembly (DfMA) within offsite construction.

On completion of this course, participants will have a greater understanding of:

- Getting the brief right at the front end: understanding the RIBA Plan of Work
- Learning to articulate client requirements in a way that does not preclude offsite
- Optioneering available systems and when to use which system
- The implications of offsite vs. traditional construction
- Collaboration, standardisation and resuable design (platform design and reusable design)
- Design demarcation and responsibility of parties
- Design freeze: early certainty and early engagement
- Implications for:
 - Onsite assembly (including lifting)
 - Logistics
 - Climate change and impact on sustainability issues
 - Performance gap

The participants need to come away feeling more knowledgeable about designing for offsite construction and importantly what skills and knowledge they can implement on a project.



Course Learning Outcomes

The course is split into eight sections, each with their own learning outcomes.

1. Introduction

By the end of this module the participants should be able to:

- Understand the benefits and business case of offsite construction;
- Understand the Construction 2025 targets;
- Have an appreciation of offsite residential designs;
- Have an appreciation of offsite non-residential designs;
- Have an appreciation of offsite infrastructure designs.

2. MMC Definition Framework

By the end of this module the participants should be able to:

- Understand the importance of using the Modern Methods of Construction (MMC) Definition Framework to speak a 'common language';
- Know the MMC Spectrum and that the framework consists of categories 1-7;
- Have an appreciation of when it is appropriate to use each category.

3. Construction Industrialisation

By the end of this module the participants should be able to:

- Understand that construction industrialisation is the underlying process behind DfMA and MMC;
- Understand the components of construction industrialisation.

4. DfMA and the RIBA Plan of Work

By the end of this module the participants should be able to:

- Understand what to consider at each stage of the RIBA Plan of Work;
- Know that there is a DfMA overlay to the RIBA Plan of Work.

5. MMC Fundamentals, Philosophy and Behaviours

By the end of this module the participants should be able to:

- Understand the fundamentals of every stage of construction industrialisation;
- Know what to consider at every stage of construction industrialisation.



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6. MMC Case Studies

By the end of this module the participants should be able to:

 Understand the benefits and advantages of MMC and DfMA in different construction sectors.

7. Optioneering

By the end of this module the participants should be able to:

- Understand how different factors impact the type of system chosen;
- Recognise that client and project drivers differ for varying projects and scenarios;
- Have an appreciation of common client and project drivers.

8. Collaboration and teamwork

By the end of this module the participants should be able to:

- Understand that collaboration and teamwork are critical for the successful adoption of DfMA and Construction Industrialisation.
- Understand that there is a need for behavioural and cultural change to achieve successful collaboration and teamwork.







The Trainer's Role

- The facilitator needs to enable a course environment for hands-on discussion and learning, such that the delegates leave understanding how they can use offsite construction in their day-to-day work.
- During the full-day session, the facilitator will remind the learners of the key components of offsite construction and will guide them through the process of applying DfMA successfully to offsite construction.
- The facilitator needs to ensure that by the end of the course the participants have a solid understanding of the key learning outcomes:
 - 1. To implement offsite you must start at RIBA stage 2;
 - 2. A whole project approach is required for successful offsite designs;
 - **3**. Offsite requires a collaborative approach with clients, contractors and manufacturers;
 - 4. There is an offsite and MMC hierachy; and
 - 5. Differences in clients, sites and use will drive different offsite solutions.

Preparation for a successful workshop

Before the workshop, the **facilitator** should:

- Run through the slide deck and familiarise themselves with the trainer notes on each slide.
- Complete the Offsite: Design e-learning module.



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- Familiarise themselves with the offsite topic on the Supply Chain Sustainability School's website, as well as offsite related resources.
- As the participants are recommended to complete an offsite self-assessment, the facilitator should also complete an offsite self-assessment so that they understand what the participants have been asked to complete.
- Edit the slide deck to include their own name and contact details.
- Edit the relevant slide to show the venue's wi-fi log-in details.
- Familiarise themselves with the location of the venue's facilities and the emergency
 procedures in the event of a fire; these should be communicated to the participants
 near the start of the session.
- Ensure that they have a copy of the 'Intro Loop' PowerPoint file, which can be left running before the session starts and during any breaks.

Before the workshop, the **participant** should:

- Familiarise themselves with the offsite topic on the Supply Chain Sustainability School's website, as well as offsite related resources.
- Complete an offsite self-assessment to understand where their current gaps in knowledge are regarding offsite and to receive a tailored action plan of learning resources.

Who should attend?

This course is aimed specifically at designers and architects, with little to no experience of offsite construction already. We recommend that workshops of 15-20 people will enable good interactions, discussions and ideas on how offsite techniques can be used and integrated into day-to-day work.



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Materials needed to run the Course

As the workshop requires a lot of hands-on discussion, the facilitator should prepare the following should they wish to take notes and thoughts from delegates throughout the day:

- White board space or flip chart paper
- Post-it notes

The trainer will also need enough hard copies of the following documents for each participant:

- Attendance sheet
- Feedback form
- Handout MMC Material Definitions, Options & Methodology
- Handout MMC Optioneering Benefits, Challenges & Opportunities
- Exercise 2 RIBA Plan of Work What to Consider
- Exercise 4.1 MMC Optioneering Project Scenarios
- Exercise 4.2 Offsite Strategy Client Drivers
- Exercise 4.3 Offsite Strategy Project Drivers
- Exercise 5.1 MMC Primary Structure Optioneering
- Exercise 5.2 MMC Matrix Assessment Criteria





Course Programme: 6 hours

The following programme describes the activities the facilitator should lead the group of delegates on.

Encourage the delegates to provide their experience on designing for offsite construction and what they skills and knowledge they can take forward into their future work – this will lead to more fruitful discussion and a sense of collaboration.

Number	Activity	Guidance notes for the trainer Note: Timings are suggestions only	
1	Welcome and	10 minutes	
	introductions	Get the delegates to introduce themselves to each other, stating their role, experience and knowledge of offsite construction.	
		Explain the aim and purpose of the day's course.	
		Ensure each delegate signs the attendance sheet and is provided with a feedback sheet. Also give the participants the two handouts:	
		 Handout - MMC Material Definitions, Options & Methodology 	
		 Handout - MMC Optioneering – Benefits, Challenges & Opportunities 	
2	Introduction to	35 minutes	
		This section provides an overview of the benefits and business case of offsite. Whilst these are already proven, it is important to get the participants to think about why they are proven and how it can improve their work.	
		The sector case studies are to provide an overview of the types of buildings that can be constructed using offsite methods.	
		Exercise 1: What are the benefits of an offsite approach? This short 15-minute exercise requires the group to split into smaller groups, discuss the benefits and their experience. Consider using post-it notes so that each group can list the benefits, and then report back their findings to the overall group.	

3	MMC Definition	35 minutes
	Framework	This is an important section that gives participants the fundamental knowledge they need to discuss DfMA and offsite in greater detail. The section provides detail on the MMC spectrum and information on each of the categories 1-7.
		Category 7 video: https://youtu.be/6s17IAj-XpU
4	Break	20 minutes
5	Construction	15 minutes
	Industrialisation	This section aims to get participants to understand where DfMA fits in within the whole construction industrialisation process.
		The interactive 'Where are you now?' question aims to get the particpants to think about where their organisation is now and where they could be after attending this course. It is important to note that not all projects are appropriate to offsite and MMC.
6	DfMA and the	45 minutes
	Work	This section provides the particpants with an understanding of what they need to do differently through the RIBA Plan of Work.
		Exercise 2: What might a designer need to know or do at each stage of the RIBA Plan of Work? Participants should use the Exercise – RIBA Plan of Work – What to Consider worksheet.
		The group should split into a few smaller groups and discuss each stage. This exercise should last approximately 20 minutes, and then allow 25 minutes for feedback and to go through the corresponding slides.
7	MMC Fundamentals, Philosophy and behaviours	2 hours 30 minutes This section of the course explores what a designer needs to consider within the other stages of the Construction Industrialisation process.



Exercise 3: What might a designer need to know or do at each of the construction industrialisation stages?

Participants should split into small groups of 2-3 and discuss the question. Consider using post-it notes to track thoughts, and then get each group to report back, potentially on one stage each if pushed for time.

8	Lunch	40 minutes
9	MMC Case	10 minutes
	Studies	This section provides some examples of offsite design case studies, with a more information on the benefits and advantages of MMC and offsite in different construction sectors.
10	Optioneering	120 minutes
		This section aims to help the participant understand how different factors impact the choice of system that is used.
		<i>Exercise 4: Client and Project Drivers</i> Exercise 4 is a pre-cursor to exercise 5. The objective of this exercise is to recognise that client and project drivers vary for different projects and scenarios. Ensure participants have the following worksheets:
		Exercise 4.1 - MMC Optioneering Project Scenarios
		Exercise4.2 - Offsite Strategy Client Drivers
		Exercise 4.3 - Offsite Strategy Project Drivers
		 Handout - MMC Optioneering – Benefits, Challenges & Opportunities
		The overall group should split into smaller groups and choose a project scenario each. They should use the handout to guide their decision for completing the <i>Exercise - Offsite Strategy Client Drivers</i> worksheet and the <i>Exercise - Offsite Strategy Project Drivers</i> .
		Each client requirement is a point on the spider diagram. The participant should choose where on a scale of 0-10 each client requirement sits and should then draw lines between each client requirement result to create their personalised spider diagram. The aim of this exercise is to demonstrate that



different projects and clients have different requirements and priorities.

This exercise should last for 10 minutes, with a 15-minute feedback session to compare the outcomes.

Exercise 5: Primary Structure Optioneering

The objective of this exercise is to get the participant to be able to identify which primary structures are best suited to certain project scenarios.

Ensure participants have the following worksheets:

- Exercise 5.1 MMC Primary Structure Optioneering
- Exercise 5.2 MMC Matrix Assessment Criteria

The facilitator must choose one of the project scenarios from the **Exercise - MMC Optioneering Project Scenarios** worksheet used in the previous exercise. The participants must get into small groups and discuss and agree which criteria are relevant for the project scenario. The participants must then score either 1 or 0 depending on how relevant the assessment criteria is to the structural options 1 being suitable for offsite, zero being unsuitable.

11	Collaboration an	nd 15 minutes
	teamwork	This is a brief section that needs to convey the importance of collaboration and teamwork for successful adoption of DfMA and MMC.
12	Summary and close	15 minutes Remember to point the participants in the direction of further learning. Ensure the participants fill in a feedback form and have signed the attendance sheet.

Related Workshops

The other courses in this Offsite Skills Project include:

- Understanding Offsite: <u>Procurement</u>
- Understanding Offsite: <u>Quantity Surveying and Cost Consultancy</u>
- Understanding Offsite: Logistics
- Understanding Offsite: <u>Project Management</u>
- Understanding Offsite: <u>Site Management</u>

