Construct Innovate
Built Environment Research Ireland

Creation of open-access and Building Regulation compliant standardised design details for residential MMC

Construct Innovate Industry Day

23rd October 2024

Dr Daniel McCrum
Associate Professor of Structural Engineering, UCD & Construct Innovate Lead PI

TECHNOLOGY CENTRE
ENTERPRISE IRELAND
IDA IRELAND SUPPORTED

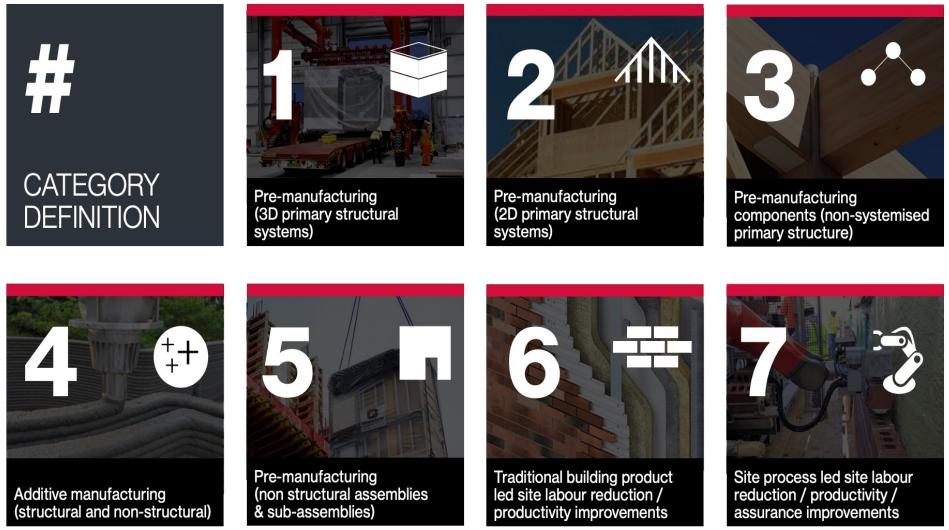
Project overview

- Background
- Project objectives
- Project work packages
- Indicative test programme
- Next steps

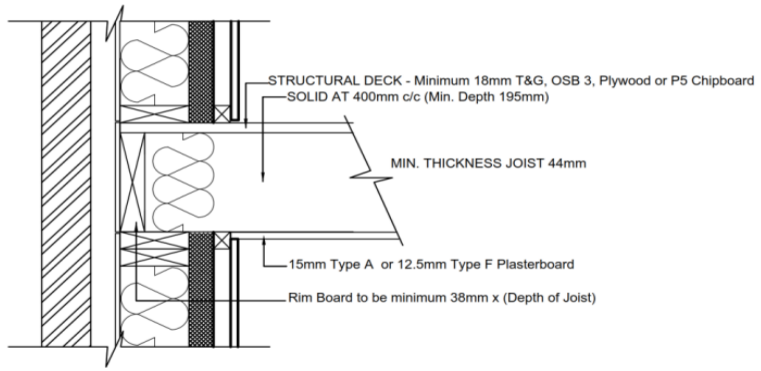
PI: Dr Daniel McCrum (University College Dublin)
CoI: Dr Magdalena Hajdukiewicz & Dr Eoin King (University of Galway)

DHLGH proposed project

- Feedback from industry around the need for standardised details for residential construction
- Support HfA delivery of new housing
- Open-source MMC standardised construction performance / details (Structure, Fire, Energy, Durability, Resistance to Moisture and Sound) for all key junctions
- The design and testing of the details are intended to achieve the performance requirements of the Building Regulations to support the mainstream development and uptake of the identified MMC system. Designers will still have design responsibility for compliance.



Solid Joists - External Wall Junction



Section

Figure 1(a) Solid Joists @ 400mm c/c

Construct Innovate
Built Environment Research Ireland

Project Objectives

OBJ 1 Identify the needs of industry for standardised details and performance requirements for MMC

OBJ 2 Identify performance and durability requirements (Parts A-M) for MMC systems

OBJ 3 Production of standardised MMC construction details based on EN standards testing[1] of floor, wall, roof build-ups and junctions that can comply with Building Regulation performance requirements, capable of being built on site, for a variety of building uses (dwellings, flats, etc)

OBJ 4 Provide open-source publication of test data and verification of performance to simplify and widen access to MMC construction for organisations

[1] "proper materials" means materials which are fit for the use for which they are intended and for the conditions in which they are to be used, and includes materials which: (a) bear a CE Marking in accordance with the provisions of the Construction Products Regulation; (b) comply with an appropriate harmonised standard or European Technical Assessment in accordance with the provisions of the Construction Products Regulation; or (c) comply with an appropriate Irish Standard or Irish Agrement Certificate or with an alternative national technical specification of any State which is a contracting party to the Agreement on the European Economic Area, which provides in use an equivalent level of safety and suitability

Project Work Packages

WP 1	Performance requirements of systems - map MMC categories versus standards, certificates and TGDs - review existing Agrément certification - investigate standardised performance and standardised details
WP 2	Gap analysis and stakeholder needs analysis of current systems - stakeholder needs analysis - gap analysis of MMC standardised performance and details - identify MMC build-up and locations for standardised performance & detailing - agreement of criteria for selecting system e.g. # of Agrément certificates, market penetration, maturity, impact, etc
WP 3	Final consultation with industry and final scoping of initial system to be tested - final MMC system products, build-ups and locations inventory - final consultation with industry

Construct Innovate
Built Environment Research Ireland

Project Work Packages

WP 4 Modelling / analysis of the identified MMC system
- review performance requirements
- preliminary modelling / analysis (structure, fire, thermal, acoustic, durability and resistance to moisture) of the systems, build-ups and locations
- report final MMC system for testing

WP 5 Testing of system to ensure performance requirements
- laboratory testing for performance requirements
- analysis and processing of test data
- demonstration of compliance

WP 6 Management, Impact and Transfer of Knowledge
- open access database
- publication of key components & performance test reports
- dissemination (conference, workshops, etc)
- recommendations for digital tools, further testing & standardisation of MMC systems

Construct Innovate
Built Environment Research Ireland

Indicative Test Programme

Table of estimated cost of physical testing for compliance

Part	Building Regulation Compliance	Cost of testing (accredited facilities)
A	Structure	€120,000
B	Fire	€960,000
C	Resistance to moisture	€450,000
E	Sound	€90,000

Table of potential certification testing matrix for one MMC system for fire safety (Part B) (repeat for Parts A, C, E)

Test ID	Fire Testing Locations	Internal board 1	Internal board 2	Internal board 3	30 min	60 min	90 min	Test Number	Repetition	Total Test Number
B1	Party Wall Panel	1	1	1	1	1	1	6	1	6
B2	External Wall Panel	1	1	1	1	1	1	6	1	6
B3	Internal Wall Panel	1	1	1	1	1	1	6	1	6
B4	Floor Panel	1	1	1	1	1	1	6	1	6
B5	Roof Panel	1	1	1	1	1	1	6	1	6
B6	Junction 1 - wall to floor	1	1	1	1	1	1	6	1	6
B7	Junction 2 - wall to roof	1	1	1	1	1	1	6	1	6
B8	Junction 3 - wall to wall	1	1	1	1	1	1	6	1	6

Construct Innovate
Built Environment Research Ireland

Next steps

Workshop 1 – Phase 1 (Q1 2025)

- Stakeholder needs analysis – all categories of MMC
- Gap analysis of MMC standardised performance and details
- IP issues
- Details already available/common that might be shared

The most market ready and impactful MMC (decision matrix) -> who goes first?

Workshop 2 – Phase 2 (Q2 2025)

- Identify MMC build-up and locations for standardised performance & detailing

Construct Innovate
Built Environment Research Ireland

Construct Innovate
Built Environment Research Ireland

Thank you

www.constructinnovate.ie

info@constructinnovate.ie

TECHNOLOGY CENTRE
ENTERPRISE IRELAND
IDA IRELAND SUPPORTED