

Construction Industry Council

Committee on Productivity

Meeting No. 003/21 of the Committee on Productivity (Com-PRO) was held on 14 September 2021 (Tuesday) at 2:30 pm in the Board Room, 29/F, Tower 2, Enterprise Square Five (Megabox), 38 Wang Chiu Road, Kowloon Bay.

Summary Notes of the Com-PRO Meeting No. 003/21:

Agenda Item	Paper	Major Resolutions / Progress Highlights
3.1	CIC/PRO/M/002/21	Confirmation of Minutes of the Previous Meeting Members confirmed the minutes of the Com-PRO Meeting No. 002/21 without any amendment.
3.2	-	Matters Arising from the Previous Meeting Mr Thomas CHAN from Development Bureau (DEVB) briefed Members on the latest development of the Rebar Product Certification Scheme. Civil Engineering and Development Department (CEDD) is engaging a third party as a scheme owner and certification body to be accredited by the Hong Kong Accreditation Services (HKAS). Establishment of the certification scheme was expected to be completed by end of 2023 with a 2-year trial period. Item 2.2 -1.2: Three reports of the research study entitled “MiC for High-rise Buildings in Hong Kong: Supply Chain Identification, Analyses and Establishment”, including market analysis report, practical guide on MiC adoption and roadmap report, had been uploaded to the CIC website for industry’s reference. The final report and reference materials on “Adopting DfMA for MEP works” had been approved by Members. Executive summary of reference materials was enclosed for Council Members’ information (see Annex), full version will be uploaded on CIC website. A concise version of the reference materials will be compiled by end of December 2021 for industry stakeholders’ easy reference as well as training and promotion purposes. Besides, a funding proposal on MiMEP will

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		<p>be submitted for the consideration by the MiC Vetting Sub-committee on CITF in early October 2021.</p> <p>Item 2.2 – 1.5: The first eDM promotion on the CIExpo 2022 had been blasted in September 2021, to all Council, Committee and i-Club Members which consisted of more than 1,100 organisations and 7,500 individual industry practitioners. Tendering on event management and production services would be invited by the end of September 2021 and the contract was scheduled to be awarded by November 2021. The CIExpo 2022 was planned to be officially announced at the “Outstanding Contractors Award Presentation Ceremony” on 2 December 2021.</p> <p>Item 2.3 - 2022 Business Plan and Budget: The 2022 business plan and budget had been endorsed by Members. The progress of some action items was reported as follows:</p> <p><u>Formulate framework and methodology for measuring productivity</u> Mr Dennis WAN from DEVB updated Members that tender had been issued for a DEVB study on the captioned topic. It was aimed to commence the study in early October 2021.</p> <p><u>Benchmarking and target setting on DfMA levels and productivity</u> The Secretariat presented a data collection plan to collect information from at least 30 building projects in both public and private building sectors, in order to benchmark the DfMA adoption levels and examine the possible correlation between the DfMA adoption levels and project performance. The Secretariat targeted to propose KPIs on DfMA adoption levels and discuss possible strategies at the next meeting.</p> <p>Item 2.5 - Update on the Research on “Smartphone as Next-generation Monitoring Devices for Construction-induced Vibrations and Noise”: The final report and user guide were approved by Members in August 2021. Both the user guide and a summary report will be published on the CIC website by early October 2021. The mobile application will be available on the iPhone app store for</p>

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		<p>free download. Relevant sample specification had been complied for industry application. The research outcomes will be further promoted to the industry through webinars.</p> <p>Updates on Ongoing Consultancy and Research Projects: <u>Research on “Application of Maturity Method for Determination of Early-age Concrete Strength in HK Construction Industry”</u> A practical guide was compiled and circulated to the Expert Group in August 2021. The research team was addressing the Expert Group’s comments. The research team submitted a request for extension of time (EOT) of 4.9 months, with no financial implication, due to the site concreting schedule restriction, unexpectedly long sensor procurement process, non-availability of calibration test results and non-existence of onsite data from in-situ temperature monitoring. Members approved the EOT request under the condition of no further extension would be accepted.</p> <p><u>Advisory Services by Mr. Tim HALL</u> Services provided by Mr. Tim HALL were completed, which included knowledge exchange on DfMA, liaison with experts/speakers, launching of the DfMA Alliance, hosting seminars and webinars, factory visits and organising Residential Hub and Infrastructure Hub meetings. The final payment had been settled. Members suggested to send an appreciation letter to Mr. HALL for his contribution. For the continuous development of the “DfMA ecosystem” and sharing international best practices, Members suggested to engage a facilitator or Mr. HALL on a need basis.</p> <p>Updates on Webinars: The webinar on “Advancement in System Formwork in Construction” was held on 20 August 2021 with a total of 768 participants.</p>

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3.3	CIC/PRO/P/006/21 (for approval)	<p>Proposed Consultancy Project on Development of a Buildability Assessment Scheme for Private Buildings in Hong Kong</p> <p>The Secretariat presented the proposed consultancy project with the aim to drive the productivity and buildability improvement in the private building sector, encourage standardisation, maximise offsite works and minimise on-site wet trade works. The scope of works includes reviewing existing means to enhance productivity and buildability both locally and internationally; to deliver an effective buildability assessment scheme; and to propose a practical implementation plan for the scheme. The project duration was proposed to be around 6 months for developing the scheme with an additional 2-3 months for approval and an estimated tender sum of HK\$1.25 million.</p> <p>Members suggested to rename the scheme as “Productivity Assessment Scheme (PAS)” with a focus on buildable design, “plug and play”, high levels of DfMA adoption, maximising adoption of offsite works and multi-trades integration. Members also reminded the Secretariat to study the Buildability Evaluation System being adopted for buildings projects developed by the Architectural Services Department. Members had no adverse comments and approved the proposal.</p>
3.4	-	<p>Update on the Consultancy Study for “Establishing a Certification Scheme for Construction Robots”</p> <p>SGS Hong Kong Ltd. (SGS) presented the progress of the captioned consultancy study. Industry consultations and visits to testing centres and suppliers were conducted over the past few months to formulate the robot certification scheme. Assessment standards including administrative and technical requirements, corresponding acceptance criteria, certification decision processes and a 5-year strategic plan had been developed and reviewed by the Expert Group chaired by Professor CHUNG Kwok-fai.</p> <p>Members opined that the accreditation scheme should be user-friendly, attractive to relevant applicants, and well recognised among worldwide standards. The Secretariat took note of Members’ expectations and would follow up with SGS on finalising the contract deliverables.</p>

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3.5	CIC/PRO/P/007/21 (for approval)	<p>Applications for the CIC R&D Fund</p> <p>13 research proposals relating to construction productivity were received for applying the CIC R&D Fund. Initial assessment was conducted based on three key criteria: value of research, cost-effectiveness and research implementation. Three research proposals were shortlisted for Members' consideration and two were invited for presentation at the meeting.</p> <p>(a) Study of Artificial Intelligence for Road Surface Depression Detection Using 3D LiDAR Data</p> <p>Dr. Charles WONG from The Hong Kong Polytechnic University presented that the proposed research aimed to develop an artificial intelligence application for road surface depression detection using LiDAR data and to devise the Hong Kong first-ever 3D point cloud library of road defects.</p> <p>While the application would be limited to public roadworks, Members agreed that the benefits generated from the research deliverables on road maintenance would be significant. Hence, Members approved the proposed research under the Collaborative Project Scheme with a duration of 18 months and at a funding support of HK\$690,000, while another HK\$690,000 will be funded by the Highways Department. The research agreement will be prepared accordingly by the CIC Secretariat.</p> <p>(b) Performance Improvement Analysis of Adopting an External Wall Painting Robot in Public Housing Project in Hong Kong</p> <p>Ms. Cherry CHEN from Amber Builder Robotics Limited presented her research proposal on the captioned subject with a duration of 8.5 months at a cost of HK\$1,547,800. The aim of the proposed research was to develop an external wall painting robot to be applied for public housing projects in Hong Kong.</p>

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		<p>Members expressed that such external wall painting robots had already been adopted in the Mainland, provision of funding for the proposed research was questionable. In addition, the applicability in Hong Kong for different types of buildings with components in various shapes was not comprehensively considered in the proposal. The Secretariat will consolidate Members' comments for Ms. CHEN's consideration.</p> <p>(c) Research Agenda in 2022 Members had no adverse comments on the proposed agenda and reminded the Secretariat to specify enhancement on construction productivity as the key objective.</p>
3.6	-	<p>Any Other Business Members took note of the tentative programme of the "International Symposium on Robotics and Automation" scheduled to be held on 10 December 2021, and the proposed list of companies to be invited for the subsequent business matching event. This event will be co-organised with the Hong Kong Science & Technology Parks.</p>
3.7	-	<p>Next Meeting 004/21 The next meeting would tentatively be held on 7 December 2021. The Secretariat would inform Members once the meeting details are confirmed.</p>

Remarks: The mentioned papers discussed at the Com-PRO and/or the full Minutes can be made available to Council Members from the CIC Secretariat upon request.

(Extracted from Reference Materials on Adopting DfMA for MEP Works)

Executive Summary

Design for manufacture and assembly (DfMA) refers to a set of principles for enabling a design process that facilitates the optimisation of all manufacture and assembly functions and contributes to the minimisation of cost and delivery time and the maximisation of quality and customer satisfaction. Originating from production industries, DfMA is considered a potential approach for the construction industry to enhance productivity, safety, sustainability and quality. It is also one of the key enablers for industrialised construction (IC).

This Guidebook aims to provide practical information for promoting the adoption of the DfMA approach to Mechanical, Electrical and Plumbing (MEP) works in Hong Kong. The optimal level of DfMA adoption for a project should be in response to the project-specific drivers including client's values and project key performance indicators (KPIs), sector category, supply chain capability, degree of repeatability possible, site/logistics constraints, etc. In order to offer guidelines for applying DfMA at different stages of projects, the structure of this Guidebook is designed based on the typical work stages of building projects in Hong Kong (as shown below). Also, information is provided about Multitrade integrated Mechanical, Electrical and Plumbing (MiMEP) which has come up in Hong Kong recently.

- Inception, Feasibility and Brief Development
- Concept Design
- Detailed Design
- Documentation and Tender
- Construction
- Handover and Post-Handover Services

It is believed that the use of building information modelling (BIM) in an integrated common data environment can drive the overall digital design and construction and streamline the DfMA work processes towards a more collaborative and integrated solution. At present, there is currently no universally accepted procurement model for DfMA. The project team members should collaborate to choose the best available procurement model option as an optimised and balanced solution after due considerations of various project factors. When applying DfMA offsite approach, it is necessary to consider best value rather than best price for the procurement strategy so that the key non-monetary benefits and full lifecycle costing are taken into account.

It is important to set KPIs for the project based on the client's objectives (e.g. shortened construction period compared to traditional approach), in order to discover benefits that can be gained by applying offsite and DfMA strategies to projects for manufacture, assembly and commissioning. The lead design professional and the specialist subcontractors appointed for the project will be required to explore and adopt innovative design and smart construction technologies to enhance construction performance

holistically and to facilitate smart operation & maintenance for asset management. Most likely, this will include the use of offsite prefabrication solutions out of the DfMA spectrum (in particular, Modular integration Construction (MiC)) by fully utilising the BIM tool and lean manufacturing/construction principles (to maximise value and minimise waste).