

Construction Industry Council

Committee on Productivity

Meeting No. 001/18 of the Committee on Productivity was held on 24 May 2018 (Thursday) at 3:00 pm in Board Room, 38/F, COS Centre, 56 Tsun Yip Street, Kwun Tong, Kowloon.

| | | | |
|---------------|----------------|-----------|--|
| Present: | Ringo YU | (RiYu) | Chairman |
| | Luen-kiu CHOW | (LKC) | |
| | Kwok-fai CHUNG | (CKFi) | |
| | Ivan FU | (FI) | |
| | Alex KWAN | (KFK) | |
| | Patrick WONG | (PtW) | for Permanent Secretary for Transport and Housing (Housing) |
| | Simon KWOK | (TKK) | |
| | Kenneth MO | (KM) | |
| | Vitus NG | (VN) | for Permanent Secretary for Development (Works) |
| | Derek SO | (KLS) | |
| | Jason WONG | (JaW) | |
| | Franki YEUNG | (FY) | |
| | In Attendance: | Jeff FUNG | |
| Michelle LAM | | | (Presenter) |
| Tomi NISSINEN | | | (Presenter) |
| Ivan SHAM | | | (Presenter) |
| Carol LI | | | (Presenter) |
| Ray SU | | | (Presenter) |
| Daniel LOOI | | | (Presenter) |
| Ka-kui CHAN | | (KKCh) | Chairman, CIC |
| Albert CHENG | | (CTN) | Executive Director, CIC |
| James WONG | | (JsW) | Manager – Research & Development |
| Terry LAM | | (TyLm) | Manager – Construction Productivity |
| Eason YUNG | | (EY) | Officer – Construction Productivity |
| Apologies: | Shujie PAN | (PSJ) | |
| | Rocky POON | (LKP) | |
| | Raymond WAN | (RW) | |
| | Sze-chun WONG | (SCW) | |

MINUTES

Action

Ir Ringo YU welcomed all members of the Committee on Productivity (Com-PRO) and invited Mr. Ka-kui CHAN, Chairman of CIC, to introduce the recent revamping of committee members appointment. Members representing different stakeholders were appointed to serve the committee with their professional knowledge and industry experiences, with an aim to enhance the industry's productivity.

1.1 Proposed 3-year Strategic Plan of Com-PRO

JsW presented the paper on 3-year work plan (2019 - 2021) with detailed timeline and associated budget for members' deliberations and endorsement.

Key initiatives to enhance productivity of the Hong Kong construction industry were proposed under four subject areas: i) factory-based construction; ii) mechanised construction; iii) productivity monitoring; and iv) productivity enabling.

KFK asked the details of electronic productivity submission system. JsW replied that the system would require the input of site work done to calculate productivity rates with the manpower data collected from the existing construction workers registration system (CWRS). Chairman supplemented that such data submission is a statutory requirement in Singapore, however not the case in Hong Kong. CTN said that the submission would be important since there was no baseline for productivity measurement. Members had a consensus that the purpose of obtaining such data has to be simple, clear and valuable to the industry development.

Regarding the proposed semi-automatic rebar cut and bend machine, CIC Secretariat mentioned that the machine would eliminate on-site non-value added works. CTN supplemented that the proposed machine is expected to be used on-site and minimise labour requirement.

FI queried that industry stakeholders might not understand how they could make use of the Construction Innovation and Technology Fund (CITF). CTN expressed that the CITF is set up to facilitate industry stakeholders to adopt available new technologies to enhance project performance, while Com-PRO is expected to roll out new initiatives to

drive construction productivity enhancement. More details of CITF would be announced in 2018 Q3 tentatively.

Chairman expressed that there may be additional aspects to be considered to improve the construction productivity. Chairman invited Members to suggest other initiatives to be included in a “long-list”. Suggested initiatives should be prioritised with the consideration of their impact and resource required.

**CIC
Secretariat**

The Working Group on Flat Inspection, which is currently chaired by Mr. Ivan FU, was agreed to be transferred to the Committee on Construction Procurement (Com-CPT). FI supplemented that associated tasks, collaborating with the Hong Kong Institute of Clerk of Works (HKICW), have commenced. A total of HK\$1.5M budget was proposed to complete the tasks by 2019.

After much deliberation, Members endorsed the 3-year strategic plan and associated budget of Com-PRO as well as the budget for the Working Group on Flat Inspection. CIC Secretariat would submit the work plan and budget to the Council for approval.

**CIC
Secretariat**

1.2 **Confirmation of the Notes of the Previous Meeting**

Matters arising from the Previous Meeting

Item 4.3: The research study entitled “Modular construction for high-rise buildings in Hong Kong: Supply chain identification, analysis and establishment” commenced on 3 April 2018 and would be monitored by the Joint Working Group on Modular Integrated Construction.

Item 4.4: Council approved the proposal entitled “Development of innovative self-compacting backfilling material for pavements in Hong Kong road network” on 9 February 2018 and approved by the Innovation and Technology Fund (ITF) on 23 March 2018. The research study will commence on 2 July 2018 tentatively.

Members confirmed the progress report of Meeting No. 004/17 for Com-PRO (Paper CIC/PRO/R/004/17) without amendment.

All to Note

1.3 Terms of Reference of Com-PRO

JsW presented the Terms of Reference of Com-PRO for Members' information.

1.4 Progress Update on the Works of Com-PRO

Committee Secretariat presented the key initiatives of Com-PRO to Members.

i. Assessing the Performance of HK Construction Industry Key Performance Indicators (KPI): An International Comparison Study

KPIs for measuring the performance of Hong Kong construction industry have been compiled and compared with three overseas countries by Consultant. CIC Secretariat has commented the draft final report and the report was being revised by Consultant and will be circulated to Members for review once ready. Chairman supplemented that once the report is endorsed, the KPIs would be updated and published on a yearly basis. KM commented that data in terms of dollar should not be used due to the currency fluctuation.

ii. Benchmarking the Construction Trade Productivity in Hong Kong

A set of framework for measuring the productivity of ten selected trades has been formulated, and their productivity rates have been measured for initial reference and comparison. The draft final report would be circulated to Members for comment in July 2018. Chairman reminded that the data accuracy, which might be affected by various factors.

TKK advised that the productivity data can be generated from the existing site attendance record, with the calculation of gross floor area (GFA) or construction floor area (CFA) and project duration from the commencement date to the issue of Occupation Permit.

FI agreed that such productivity data collection aligns with the Terms of Reference of Com-PRO, and a framework with data

required should be discussed within Com-PRO in order to acquire relevant data for practical use. KLS suggested that such data could set as initial statistics for benchmarking the performance of productivity enhancement measures. JaW supported the data collection for productivity impact analysis due to the introduction of new technologies.

Chairman concluded that the study would be wrapped up, but follow-up action should focus on the development of the data acquisition platform.

iii. A Comprehensive Productivity Appraisal of the Hong Kong Construction Industry

77 measures for improving productivity of the Hong Kong construction industry have been proposed in the study. The principal investigator, Dr. Wei PAN, was addressing the second round comments from the Buildings Department (BD) and the Development Bureau (DEVB). The draft final report would be circulated to Members for comments in June 2018. Chairman suggested considering some of the proposed measures to be listed in the long-list for Com-PRO.

**CIC
Secretariat**

iv. Achieving Productivity Leap through Construction Process Re-engineering

The draft final report and guideline presenting construction process re-engineering of the selected trades have been received and would be circulated to Members for comments in June 2018 and the progress was presented at item 1.5.

v. Investigating the Potentials of Implementing Robotics and Automation in the Context of Large-scale Housing Development for Hong Kong

The draft final report has been received. Committee Secretariat would circulate the report to Members for comments once ready and invite the researcher to present in the next meeting.

**CIC
Secretariat**

vi. Development of Innovative Self-Compacting Backfilling Material for Pavements in Hong Kong Road Network

Council has approved the proposal and the study will be jointly funded by ITF and CIC. The progress was presented at item 1.6.

vii. Feasibility Study of Lego-inspired Construction

The proposal was supported in-principle in the meeting no. 002/17 of Com-PRO, but the terms and conditions of the agreement were under negotiation. The University of Michigan suggested to keep silent on the governing by the laws of HKSAR. CIC shall have the rights to use the research outcomes within Hong Kong by providing a list of approved contractors.

Members had a consensus that using US laws for any disputes raised by the US university would not be favoured to CIC. It would also be difficult to explain to the industry the reasons of not owning the IP rights by CIC. KM concerned that the dismantling feature would not be applicable in Hong Kong. CKFi and KLS questioned what the generic benefits could be brought to the industry by this idea. Members rejected the proposal after much deliberation.

viii. Future Application of 3D Printing in Construction: Impact on Construction Industry Supply Chains in Hong Kong

JsW presented the original deliverables of the research study, the adoption of HKSAR law to govern the agreement and the arrangement to own all the rights jointly by the University of Maryland and CIC. Concerning the practicality of the study, an alternative scope was proposed to explore the feasibility of building the first 3D-printed house in Hong Kong in terms of technical, legal and financial requirements.

PtW raised that the key issue would be the compliance with the Buildings Ordinance. KLS stated that such 3D printing technology was proven and the focus should be on the legal aspect. KM claimed that there would be no market demand for such 3D printed low-rise houses in Hong Kong. KLS commented that while the

research findings would not be immediately applicable, the acceptance and inspection criteria are worth investigating through the study.

KFK expressed that there was a holistic plan in Dubai to build 3D-printed houses in 2025 and perceived that 3D printing technology should be further explored. However, KFK doubted that whether US researchers would be familiar with the BD regulations in Hong Kong. FI expressed that CIC should focus on practical initiatives that could be applied in short term improving industry performance in productivity. JaW concerned how such technology could have immediate effect on improving construction productivity.

CKFi stated that the study would be worth carrying out in identifying potential problems and practical solutions. The study should focus on the BD submission process, and therefore the US researchers may not be appropriate to lead the study.

After deliberations, Chairman suggested that the proposed study should consider BD requirements and would be kept in view in the Com-PRO's "long-list".

1.5 **Achieving Productivity Leap through Construction Process Re-engineering**

Mr. Jeff FUNG from the Hong Kong Productivity Council (HKPC) presented the project findings, highlighting on how efficiency could be improved for formwork erecting, on-site rebar cutting and bending, and concreting operations, and the possible extended study in verifying the suggestions.

KFK asked whether there was suggestion for formwork erecting. Mr. FUNG reported that steel and aluminium formworks were used in most of the projects visited and the use of timber formwork is limited. Suggestions on using electric tools and standardised arrangement were made for timber formwork erecting. TTK supplemented that it was mandatory requirement of using metal formwork in public housing projects and timber formwork was used only in podium and external area.

Chairman stressed that HKPC should stay in close contact with relevant trade unions or associations to formulate effective productivity enhancement measures.

1.6 **Innovative Backfilling Materials for Pavements in Hong Kong**

Dr. Tomi NISSINEN and Ms. Carol LI from the Nano and Advanced Materials Institute Limited (NAMI) presented the research details and payment schedule respectively. Chairman reminded Members that the payment term of the research that CIC was required to pay HK\$ 1.5M by the mid-point of progress (i.e. the 9th month after the commencement).

Dr. NISSINEN reported the proposed material, which is a type of lightweight and foam concrete, could be used universally and the high thermal conductivity of material could protect underground utilities conduits. In addition, the material could be broken by hand tools and it is expected to be reusable.

KM concerned the price of proposed material. Dr. NISSINEN replied the price would be competitive and labour cost for filling trenches could be saved. FY reminded Dr. NISSINEN the proposed material would leak into conduits due to its high flowability during the compaction and the underground utilities would be damaged. Dr. NISSINEN understood that the conduits should be able to withstand the moisture content inside soil. Dr. NISSINEN added that colour additive could be used in the proposed material to alert workers the existence of conduits during excavation.

CKFi concerned the thermal conductivity value of proposed material. Dr. NISSINEN has benchmarked the proposed material against existing backfilling material and consulted relevant utilities companies. The propose material could perform better due to its high thermal conductivity, flowability and workability.

1.7 **Research proposal on high performance precast concrete shear wall system with trapezoidal connections**

Dr. Ray SU presented the significance, objectives, methodology, related budget and schedule of the proposed research study.

FY indicated that the Hong Kong Housing Society (HKHS) has already adopted a similar precast concrete shear wall system in one of their projects, and asked whether the proposed research aimed at seismic design. Dr. SU replied that the research would conduct tests to demonstrate the effectiveness of different reinforcement arrangement details in term of seismic design. FY also indicated that the consultant team of HKHS has worked out with BD in various details of trapezoidal connection joint for construction purpose.

Chairman noticed that there was no conclusion on seismic-resistant building design codes and requirement by BD now. After deliberations, Members agreed to reject the proposal.

1.8 **Any Other Business**

7 Com-PRO Members and 4 CIC staff will join the technical visit to Finland and Germany from 13 to 21 June 2018 to take a close look of the construction automation technologies. Lessons learnt will be shared with Members in the next meeting.

Ir Rocky POON, was nominated as the representative of Com-PRO to participate in the Working Group on facilitating the operation of CITF due to his expertise in E&M engineering. Committee Secretariat would further contact Ir POON for the nomination.

**CIC
Secretariat**

1.9 **Next Meeting 002/18**

The next meeting was scheduled in July 2018. Committee Secretariat would inform Members once the meeting date was confirmed.

All to Note

The meeting was adjourned at 5:30 pm.