

**Construction Industry Council**

**Committee on Productivity**

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Meeting No. 002/16 of the Committee on Productivity (Com-PRO) was held on 23 June 2016 (Thursday) at 9:30 am at Meeting Room, ZCB, 8 Sheung Yuet Road, Kowloon Bay, Hong Kong.

Present:	Christopher LEUNG	(KYL)	Chairman
	Kai-sing KWAN	(KSKn)	for Permanent Secretary for Transport and Housing (Housing)
	Vincent MAK	(VM)	for Permanent Secretary for Development
	Sze-chun WONG	(SCW)	
	Shujie PAN	(PSJ)	
	Tommy NG	(TN)	Association of Consulting Engineers of Hong Kong
	Ringo SHEA	(RSh)	Hong Kong Federation of Electrical and Mechanical Contractors
	Kam-leung TSE	(KLT)	Architectural Services Department
	Nicholas CHAN	(NC)	Buildings Department
	Vincent CHEUNG	(VC)	Hong Kong Construction Association
In Attendance:	Thomas NG		(Presenter)
	Eric ZHANG		(Presenter)
	Christopher TO	(CT)	Executive Director
	Julian LEE	(JnL)	Senior Manager - Research & Development
	James WONG	(JsW)	Assistant Manager - Research & Development
Apologies:	Ivan Chin-shing FU	(FI)	
	Kwok-kwan NG	(NKK)	

**PROGRESS REPORT**

**Action**

**2.1 Confirmation of Progress Report of the Previous Meeting**

Members took note of Paper CIC/PNR/R/001/16. With no further comments, Members confirmed the Progress Report of the Meeting No. 001/16 of the Com-PNR.

**All to Note**

**2.2 Renaming and Amending Terms of Reference of Committee on Productivity**

Members took note of Paper CIC/PRO/P/004/16 and the endorsed amendments to the Terms of Reference of the Committee on Productivity (“Com-PRO”) under the Construction Industry Council (“CIC”).

**All to Note**

**2.3 Benchmarking the Construction Trade Productivity in Hong Kong**

Dr. Eric ZHANG from the Hong Kong University of Science and Technology, the Principal Investigator of the consultancy study, delivered a presentation on the research progress. The five most critical construction trades of the building and infrastructure projects for benchmarking were determined. The five major future tasks were:

- 1) Collection of productivity data from local and overseas contractors;
- 2) Field trade productivity measurement of local projects;
- 3) Comparison of productivity: Hong Kong vs. overseas;
- 4) Establishment of productivity benchmark indicators; and
- 5) Analysis of factors affecting trade productivity.

Dr. ZHANG pointed out the consultancy team had encountered difficulties in collecting productivity data owing to its sensitive nature. Besides, field measurement was apparently not feasible mainly

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because contractors were not inclined to be involved. The team would like to extend the project completion date for six months from July 2016 to January 2017.

PSJ said that contractors would not have the right to disclose information of interim payment without clients' approval pursuant to mutual confidential agreement, whereas the government could take the initiative to disclose such information of the public construction projects.

VM believed that information on final measurement of completed projects, such as the total quantity for physical output and manpower breakdown, would be useful for measuring the trade productivity. He would help request relevant government departments for the necessary information but the project information from the private sector was still essential for a full picture. VM opined that the consultant might approach various associations, such as the Hong Kong Bar-Bending Contractors Association, to obtain data for different trades.

**DEVB**

**Consultant**

The Chairman raised concerns about the difficulty of obtaining data from other countries for international comparison. He also opined that the consultant could compare the productivity performance with countries that had similar construction practices. In response, Dr. ZHANG said that the international data would be obtained from multinational companies located in Hong Kong, and that Singapore was selected for comparison.

Members agreed to extend the completion date from July 2016 to January 2017.

## 2.4 **Development of High Modulus Concrete for Tall Buildings**

JnL reported that the study had been completed with significant findings. The final report was received in May 2016 and copies would be circulated to the industry stakeholders for reference. Several developers had already expressed interest in conducting trials with the

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research outcome.

NC said that this study could be discussed in the meeting of the Technical Committee of the Buildings Department (“BD”). He believed that the Code of Practice for concrete could be revised to ensure a wider application of the new concrete. VM supplemented that this new concrete could also be discussed in the Standing Committee on Concrete Technology of the Development Bureau (“DEVB”) and he would facilitate the liaison between the DEVB and CIC.

**BD**

**DEVB**

2.5 **Assessing the Performance of the Hong Kong Construction Industry, Key Performance Indicators (KPI): An International Comparison**

Prof. Thomas NG from the University of Hong Kong, the Principal Investigator of the consultancy study, presented the objectives, research progress and findings.

He reported that the biggest challenge of the study lied on the collection of both objective and subjective data. The former would be obtained from statistical agencies through a top-down approach for better understanding on the actual industry performance, while the latter was taken by a bottom-up approach. The consultancy team had sought advice from 11 senior industry practitioners on the concept of 3-tiers and identification of unified KPIs.

Limitations of this study were mainly related to the availability of data and measurement method. The study substantially adhered to the 4 areas of KPIs stated in the CIC’s Hong Kong Construction Industry Performance Report (i.e. Environment, Safety, Productivity and Manpower), except that the Dispute Resolution KPI would not be considered as a Tier-1 indicator. Moreover, heated topics in the industry, such as innovation and political issues, would also be taken into account.

**Consultant**

The interim report would be published in early July 2016, while the

final report was expected to be issued in November 2016.

VM asked if the construction productivity would change subject to the fluctuation of the Gross Domestic Product (“GDP”). Prof. Thomas Ng replied that the consultancy team would look into implications behind the data, which would be adjusted for inflation. Trends of the GDP and KPIs in the past ten years would be demonstrated in this study. VM added that their trends could be compared for investigating the possible correlation between the housing price and KPI.

Prof. NG raised two other important aspects that should be taken into consideration. First, data should be also obtained from the industry rather than open sources, since adopting the top-down approach might result in ineffectiveness. Second, the consultancy team was considering to conduct an international KPIs study. The team would meet with the Construction Excellence of UK on 22 July 2016 to discuss the room for cooperation.

The Chairman invited Members to express opinions on the study, if any, to the CIC Secretariat within one week of this meeting.

**All to Note**

## 2.6 **Achieving Productivity Leap through Construction Process Re-engineering (CPR)**

The Chairman briefed Members on Paper CIC/PRO/P/005/16. The study would focus on re-engineering the construction processes and improving productivity of various trades in the Hong Kong building sector.

JsW said that this study would be divided into two phases with an aim to re-engineer the construction processes of three and five key construction trades respectively. Formwork erecting, bar bending and fixing, and concreting had been selected for investigation in the first phase. The research period of phase 1 would last for around eight to nine months from July 2016 to March 2017 with an estimated contract sum of HK\$1,500,000. Two academic institutes and three private

companies had shown interest in bidding for the study.

A Member reflected that there had been similar researches on improving the productivity for different trades and that simply shortening the time of construction processes would lead to other problems, in particular safety issues. He suggested that this study should also focus on the period before the construction stage. In response, the Chairman said that the idea for this study was raised by the Chairman of the CIC pinpointing the problem of manpower shortage in the construction industry. He added that there was another on-going study investigating the entire construction process and constructability.

A Member asked how productivity would be defined in this study. JsW replied that this study might refer to the definition developed from the on-going consultancy study “Benchmarking the Construction Trade Productivity in Hong Kong”. A framework would be implemented for measurement of productivity and benchmarking.

A Member believed that most of the processes had been mechanised or adopted prefabrication without much room for improvement. The consultant might explore on private construction projects as a starting point in view of their unique features making mechanisation or prefabrication difficult. The Chairman said that re-engineering the construction processes would be feasible for those projects where prefabrication was inapplicable.

A Member commented that the three selected trades should be studied and reviewed as a whole given that their work processes might be interrelated. Besides, it would be also worthwhile to investigate other aspects, including site logistics. Members had no further comments and endorsed the study. JsW said that Members’ suggestions would be considered. A representative of the consultant to be engaged would report in the next Com-PRO meeting.

**CIC  
Secretariat**

## 2.7 Establishment of Construction Innovation Centre

The Chairman briefed Members on Paper CIC/PRO/P/006/16. With consent of the CIC Members, the Com-PRO would take lead to contemplate strategies and necessary actions. The implementation progress would be reported to the Council directly.

The Chairman stressed on the importance of having the steering group which consisted of the representatives from each Committee of CIC and opined that the local innovation projects should be assigned to the respective committees for monitoring. On the other hand, overseas innovative technologies should be brought in and handled by the whole Centre rather than one of the Committees. The Centre should then propose consultancy studies and cooperate with the relevant government departments for trials in Hong Kong.

The Chairman commented on the membership of the Centre mentioned in the preliminary proposal. He said that rather than setting up membership, the Centre might be owned by the CIC.

A Member expressed concerns about the potential conflicts of interest or advantage transfers when specific innovative products, especially proprietary products, were advertised through the Centre. The Chairman explained that each showcase was supposed to display different products under a certain theme. In addition, an assessment panel would be established to evaluate each application and only those successful applications would be granted with partial financial support. The rest of the costs would be borne by the applicants. A Member added that the evaluation and vetting procedures should be supported by all Committees with strict requirements.

JnL said that the CIC had referred to overseas practices in importing innovative technologies. Particularly, Singapore's Building Construction Authority ("BCA") established the Building Innovation Panel led by the Prime Minister and industry practitioners few years ago to identify global areas of innovation that could be imported. He believed that achieving innovations through the Centre could hardly

be realised within a short period of time and cooperation between different stakeholders would be key to success. The Centre would focus on seeking innovations and demonstrating their feasibility to the approval authorities.

2.8 **Potentials of Implementing Robotics and Automation in Housing Development for Hong Kong**

JsW briefed Members on Paper CIC/PRO/P/007/16 and introduced the background of the study. The revised proposal included a prototype construction robot which would incur additional costs for demonstration purposes. JnL supplemented that Prof. Thomas BOCK had a strong background in construction automation and robotics and was used to promoting automation and robotics in different countries. Members agreed that Prof. BOCK and his specialised team would be capable of recommending suitable strategies on automation and robotics for the local construction industry, and that he could be engaged for the study.

Without objection from Members, the research proposal and a project sum of 132,212.43 €, which included the additional charge for CIC to own all intellectual property rights, were approved. The CIC Secretariat shall follow up and prepare the agreement.

**CIC  
Secretariat**

2.9 **Investigating the Potential Application of 3D Printing Technology for Construction Supply Chains in Hong Kong**

The Chairman briefed Members on Paper CIC/PRO/P/008/16 and introduced the background of Prof. Mirosław J. SKIBNIEWSKI, proposer of the study. The Chairman said that the 3D printing technology might not be applicable for the time being but would be feasible in future. It would be of use to investigate what could be achieved by this technology through a paper study.

Members agreed that a study on the 3D printing technology would be



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valuable to examine whether it was feasible to apply in the local construction industry. And as there was currently lack of expertise in the area of 3D printing technology, Members agree to nominate Prof. SKIBNIEWSKI for the study. The CIC Secretariat shall invite Prof. SKIBNIEWSKI to prepare a full proposal for Members' perusal.

**CIC  
Secretariat**

**2.10 Integrating Constructability in Project Planning and Design**

JnL said that this study had been open for tendering twice but inadequate tender submissions were received. In the previous meetings, a professor from the Hong Kong Polytechnic University said that a preliminary prototype for this study had already been available. DEVB and Architectural Services Department ("ArchSD") had also devoted efforts to investigating the issue of constructability. JnL suggested two approaches to proceed the study:

- 1) To continue re-tendering; or
- 2) To cooperate with the above-mentioned government departments or other institutes based on the prototype developed by the Hong Kong Polytechnic University.

He suggested having a discussion with the government departments about the future directions of this study. KLT said that ArchSD focused on design and simplification of construction procedures to lower the demand for manpower. In addition, ArchSD had also taken reference from the scoring system established by the BCA for evaluating different construction methods. ArchSD would continue to increase the passing mark for achieving higher quality. With an objective to develop an appraisal system suited to the Hong Kong construction industry, a preliminary framework had been developed. The most difficult task was to collect adequate productivity data on specific construction components or systems (e.g. cast in-situ system). He hoped that the Com-PRO could help gather the data from private projects. He also supplemented that effects of the "Designated Workers for Designated Skills" Provision would also be considered when conducting the study.

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SCW suggested that a team should be established to provide additional assistance and supplement the government's in-house study. The Chairman agreed and the team should focus on the private construction projects, work with the government departments, adopt similar research methodology and share information with the government departments. A more comprehensive result could be provided as long as both public and private projects could be covered. The CIC Secretariat should consider adopting the above suggestion.

**CIC  
Secretariat**

**2.11 Any Other Business**

The Chairman said that each CIC committee should implement their own research areas in accordance with the previous Council meeting. Any research proposals submitted would be assigned to the respective Committees subject to their implemented research areas but not excluding in-corresponding research proposals.

JnL said that the next round of open call for research proposals for the CIC Research Fund would commence in 2017. A research agenda shall be discussed and confirmed in the next meeting.

**2.12 Tentative Date of Next Meeting 003/16**

The next meeting is tentatively scheduled in September 2016. The Secretariat will inform Members once the meeting date is confirmed.

**All to Note**

There being no further business, the meeting was adjourned at 12:30 pm.