BCA launches Centre for Lean and Virtual Construction
CEO’S MESSAGE

Dear readers,

The first Construction Productivity Roadmap, launched in 2010, aimed at driving the built environment sector towards an average 2 to 3 per cent productivity growth per year until 2020. We have just crossed the halfway mark with convincing progress! BCA also introduced the second roadmap last year, targeting three key areas – higher quality workforce, higher capital investment and better integrated construction value chain. Under this roadmap, $450 million has been set aside under the second tranche of the Construction Productivity Fund (CPF) to support workforce development, technology adoption and capability building schemes.

As part of our efforts to encourage the adoption of new technologies for construction, BCA launched the Centre for Lean and Virtual Construction (CLVC) – a first-of-its-kind experiential facility. The million-dollar facility, which is located at BCA Academy, aims to equip built environment professionals towards process change based on the concepts of lean and virtual construction and facilitates the Virtual Design and Construction (VDC) process using Building Information Modelling (BIM). This enables project teams to build digitally first, before the actual construction. Industry firms can now rent the facilities at a nominal rate and experience firsthand, how technology can help raise productivity (up to 20%) throughout the construction value chain.

In the midst of transformation, the built environment sector will require a higher quality workforce equipped with technology-oriented skills and knowledge. When BIM was first introduced, we discovered we could do so much more with a 3D BIM model. Now, there is even 4D and 5D BIM! Touted as one of the key technologies to improving productivity and integration across the value chain, many local institutes of higher learning (IHLs), including the Singapore University of Technology and Design (SUTD), have incorporated BIM technology into their curriculum.

As we continue to sow the seeds of transformation and harvest the fruits of productivity, we must also constantly improve and renew requirements to help the sector move forward. From 1 January 2016, the Man-Year Entitlement (MYE) Formula for all project categories will be adjusted according to the Man-Year Adjustment Factor (MYAF) to address the impact of fluctuating tender prices on MYE allocation. Also, from 1 January 2017 onwards, MOM will require all construction firms to have at least 10% of their work permit holders (WPHs) qualified as “Higher Skilled” R1 workers. To better prepare firms for this new requirement, BCA has, after extensive consultation with the industry, accepted the industry’s proposal to implement a two-year upgrading phase (1 Jan 2015 to 31 Dec 2016) during which firms that have not built up their R1 pool will be required to upgrade 5% of their WPHs in 2015 and another 5% in 2016.

As we continue to embark on our productivity journey, I look forward to your continued support and active participation to build a better tomorrow for the sector and for Singapore.

Dr John Keung
Chief Executive Officer
Virtual Reality Centre to Equip New Generation Builders

The one-stop immersive learning facility allows visitors to experience the future of productive building.

Built environment stakeholders can now simulate construction processes and immerse themselves in a 3D walkthrough at the newly opened Centre for Lean and Virtual Construction by BCA.

The first-of-its-kind experiential facility located at the BCA Academy was officially opened by Senior Minister of State for National Development Desmond Lee on 21 December 2015. Close to 60 built environment professionals were treated to a showcase of the latest 3D technologies and Building Information Modelling (BIM) software, Virtual Design and Construction (VDC) technologies as well as Lean Construction concepts and applications.

### Highlights at the Centre for Lean and Virtual Construction

The various experiential zones within the Centre provide unique focus areas and opportunities for an immersive experience.

- **Zone 1: Dynamic Exhibition**
  - Objectives, capability and setup of the Centre

- **Zone 2: Virtual Design and Construction (VDC)**
  - VDC, BIG Room concept, scenario-based training
  - Live demonstration by Surbana Jurong and Straits Construction

- **Zone 3: Augmented Reality/Virtual Reality (AR/VR)**
  - Hands-on experience of AR/VR tools
  - Live demonstration by Shimizu Corporation

- **Zone 4: Integrated Concurrent Engineering (ICE)**
  - Concept of ICE
  - Live demonstration by RSP Architects Planners & Engineers

- **Zone 5: BIM Connect**
  - Live experience of immersive virtual reality on big screen with 3D glasses
  - Live demonstration by DCA Architects

- **Zone 6: Lean Construction**
  - Importance and benefits of Lean Construction

- **Zone 7: BIM On-site**
  - Simulated on-site setting for “BIM to Field” and “Field to BIM”
  - Case examples in Singapore
  - Live demonstration by Hydronav-Trimble

The Centre will equip built environment professionals with process-change skills based on Lean Construction and virtual construction concepts. It will also facilitate VDC processes via BIM to encourage project teams to build digitally before actual construction. Such “full-dress rehearsals” conducted in a virtual environment can enhance collaboration and integration during the project delivery process, which can improve construction productivity by up to 20%.

The Centre houses various experiential zones that will show how BIM, VDC and lean principles can strengthen project performance and productivity. It is open to industry firms and institutes of higher learning, with the latter paying lower usage fees. To find out or to book the facility, please email bca_clvc@bca.gov.sg.
Since 1 July 2013, the Ministry of Manpower and BCA have implemented the Tender Price Index (TPI) with the adjusted Man-Year Entitlement (MYE) allocation formula, which takes into account the effect of fluctuations in tender prices.

The MYE system allocates workers from Non-traditional Sources and the People’s Republic of China according to project type and contract value. However, due to the cyclical nature of the construction industry and varying economic conditions, tender prices of construction projects tend to fluctuate and affect the MYE allocation to projects.

To address the impact of fluctuating tender prices on MYE allocation, the MYE formula will be adjusted with the Man-Year Adjustment Factor (MYAF) on 1 January of each year for all project categories. MYAF is computed based on the TPI tabulated for the previous financial year and is reviewed annually.

For example, for the period of 1 January 2016 to 31 December 2016, the MYAF is 0.946, that is, a 5.4% adjustment downwards to the MYE allocation.

### ADJUSTMENT TO MAN-YEAR ENTITLEMENT (MYE) FORMULA FROM 1 JANUARY 2016

To take effect from 1 January 2016

<table>
<thead>
<tr>
<th>Nominal Project Value</th>
<th>MYE Allocation (without TPI adjustment)</th>
<th>Man-Year Adjustment Factor (MYAF)</th>
<th>MYE Allocation (with TPI adjustment)</th>
</tr>
</thead>
<tbody>
<tr>
<td>$15 Mil</td>
<td>103</td>
<td>0.946</td>
<td>103 x 0.946 = 97</td>
</tr>
</tbody>
</table>

*Tender Price Index (TPI) measures the movement of tender prices of construction projects. This index is compiled from tender prices that represent what a client must pay to construct a new building.

### TRAINING & DEVELOPMENT

**THE RIGHT SKILLS CAN LEAD YOU TO A NEW WORLD OF OPPORTUNITIES**

**Find out more about the SkillsFuture for the Built Environment today**

SkillsFuture is a national movement to provide Singaporeans with the opportunities to develop their fullest potential throughout life. Through this movement, individuals can own a better future with life-long learning. The skills, passion and contributions of every individual will drive Singapore’s next phase of development towards an advanced economy and inclusive society.

No matter where you are in life—schooling years, early career, mid-career or silver years—you will find a variety of resources to help you attain mastery of skills.
NEW MINIMUM R1 REQUIREMENTS AT FIRM LEVEL
To take effect in 2017

BCA encourages building a bigger pool of higher skilled R1 workers so that firms can enjoy significant lower levy rates and a longer Period of Employment (POE) of 22 years for such workers.

From 1 January 2017, the Ministry of Manpower will require all construction firms to have at least 10% of their work permit holders (WPHs) qualified as “Higher Skilled” R1 workers. To prepare firms for this new requirement, BCA will implement a two-year upgrading phase (from 1 January 2015 to 31 December 2016), during which firms which have yet to build up their R1 pool will be required to upgrade 5% of their WPHs in 2015 and another 5% in 2016.

Through the Workforce Training and Upgrading Scheme, BCA supports the firms’ efforts to upgrade their workers by co-funding up to 80% of the course fees and testing fees. Since 1 June 2015, workers who fail at their first attempt at upgrading can enjoy up to 40% in subsidy for 2015 and 2016. These training courses are available at the 26 Approved Training and Testing Centres and the BCA Academy in Singapore.

BCA had organised a series of briefing sessions in 2015 to help firms familiarise themselves with these new measures. More than 800 construction firms attended the briefings.

3 Milestones to Note:
1. From 1 January 2015, all construction firms are required to:
   a. Upgrade 5% of their firm’s own work permit holders (WPHs) by end 2015
   b. Upgrade another 5% by end 2016

   Construction firms which have at least 15% of their WPHs qualified as R1 workers as at end 2014 will be exempted from the upgrading requirement for 2015. Similarly, firms with at least 15% R1 workers among their WPHs as at end 2015 will be exempted from the upgrading requirement for 2016.

2. The four pathways for firms to upgrade “Basic-skilled” R2 WPHs to “Higher-skilled” R1 WPHs:
   - **Pathway 1: CoreTrade Scheme**
     Workers with at least four years of construction experience in Singapore and who pass the stipulated skill assessments conducted by BCA can be registered under the Construction Registration of Tradesmen (CoreTrade) registration scheme to qualify as R1.
   - **Pathway 2: Multi-skilling Scheme**
     Since July 2012, the Multi-skilling Scheme allows construction firms to upgrade WPHs with minimum four years of construction experience in Singapore and is certified in two or more trade skills to the R1 tier.
   - **Pathway 3: Market Based Skills Framework (MBF)**
     Since August 2014, MBF allows R2 WPHs to upgrade to R1 status if they have at least six years of construction experience in Singapore and earn a fixed monthly salary of $1,600 or more.
   - **Pathway 4: Direct R1 Pathway (NEW!)**
     Since September 2015, the Direct R1 Pathway allows workers who passed the SEC(K) at Direct R1 higher skills standards and draw a fixed monthly salary of $1,600 or more to qualify for R1 status. This benefits firms that bring in better quality workers from overseas, and encourages the upgrading of their better quality existing R2 workers who have fewer than four years of construction experience in Singapore.

   The eligibility criteria of the upgrading pathways are summarised in the following table.

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Existing pathways</th>
<th>Newly introduced pathway (since September 2015)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(A) CoreTrade Scheme</td>
<td>(B) Multi-skilling Scheme</td>
</tr>
<tr>
<td>Local Construction Experience</td>
<td>Min. 4 years</td>
<td>Min. 4 years</td>
</tr>
<tr>
<td>Test</td>
<td>Pass the CoreTrade Test</td>
<td>Pass the Multi-skilling Test</td>
</tr>
<tr>
<td>Fixed Monthly Salary*</td>
<td>X</td>
<td>X</td>
</tr>
</tbody>
</table>

Note: "Fixed monthly salary" refers to the sum of basic monthly salary and fixed monthly allowances.
Note* : Employers are required to update the WPH’s fixed monthly salary of at least $1,600 or more at MOM’s Work Permit Online system.

3. In January 2015, BCA sent out notification letters to construction firms on their exact number of R2 WPHs to be upgraded for 2015. To help construction firms to monitor their upgrading requirements, BCA also introduced a self-check portal to enable firms to check their upgrading status during this two-year upgrading phase.

For more information on the R1 self-check portal, please visit: https://www.bca.gov.sg/upgrading_selfcheck/r1upgrade.aspx.

For more information on the 2-year upgrading phase, please visit: http://www.bca.gov.sg/manpower/raisequalityofworkforce.html.

For more information on the Direct R1 pathway, please visit: http://www.bca.gov.sg/manpower/others/DirR1BriefingEnglish.pdf.
SEF SPACEHUB
Launch of Singapore’s first integrated construction and prefabrication hub

SEF SpaceHub by SEF Construction Pte Ltd is the first Integrated Construction and Prefabrication Hub (ICPH) awarded under BCA’s public tender in 2013. It is the world’s first multi-storey fully integrated precast facility equipped with the automated pallet precast production circulation system, automatic welded mesh fabrication and placement machine and a cutting-edge multi-tier racking system to store precast elements.

The opening on 23 September 2015 was officiated by Mr Lee Yi Shyan, Former Senior Minister of State for Trade & Industry and National Development. It marked a milestone in the built environment’s journey towards productivity improvement. The entire manufacturing process at SEF SpaceHub – including the storage and retrieval of precast components – are supported by advanced Building Information Modelling, a master computer control and enterprise resources planning software.

Such state-of-the-art facilities are the next step forward for precasters to shift towards automation, process integration, improved quality and significant productivity improvement. ICPHs were introduced to steer the industry towards a reduced reliance on foreign workers and a wider adoption of precast construction. They are highly mechanised production facilities on long leases. ICPHs also epitomise the Design for Manufacturing and Assembly approach by producing many of the precast components needed for on-site assembly in a factory environment.

BCA has awarded two more sites for the development of ICPHs to Straits Construction Singapore Pte Ltd and Soil-Build (Pte.) Ltd. Both ICPHs are expected to be completed by end 2016 and 2017 respectively. A total of 10 ICPH land tenders are expected to be rolled out by 2020.

Features at SEF SpaceHub

Located at Kaki Bukit and spanning 32,680 m², SEF SpaceHub comprises:

- A five-storey factory block, four-storey office building and a workers’ dormitory
- Cutting-edge automated precast machinery, which increases output by two to three times with only half the amount of workers needed for the production of precast components
- High-quality precasting under sheltered conditions to minimise disruptions from unfavourable weather conditions
- Three-tier automated storage rack system for precast components
- Dust-free and automated concrete batching plant with underground aggregate storage
- Capability to produce more than 25 types of components including columns, beams, planks, walls, facades, staircases, household shelters and prefabricated bathrooms

Automated Pallet Stacker
Automated Concreting Machine
Effective Project Control, Higher Productivity

Louis Khoo, Director, Kimly Construction Pte Ltd, gives us a glimpse into his company’s 4D and 5D BIM journey, and the challenges faced in implementing new platforms and processes.

1. What motivated your organisation to embark on 4D and 5D BIM?

It was a logical progression as we were looking to develop our current BIM capabilities and standards with a more holistic approach. While 3D provides many coordination functionalities, 4D and 5D are powerful tools for cost control and higher productivity.

Estimation capabilities will be enhanced and operational staff will be better able to plan. By using 4D and 5D BIM to eliminate redundant steps and increase the speed and accuracy of our data and decision making, we are taking a big step towards higher organisational productivity.

2. How has Kimly implemented 4D and 5D BIM?

We began implementing 4D and 5D BIM via “lab sessions”. These sessions are conducted in a collaborative environment with key members from the entire project team participating. The collaboration allows the different departments to better understand how their inputs will affect the whole value chain and organisation, as well as how a new platform and business process can enable them to be more productive. These have been motivating factors for everyone.

3. Which software does Kimly use? What are some of its important features? How has Kimly benefited?

We are currently using Autodesk Revit to produce our BIM and RIB iTWO to implement an integrated solution for project control. With an integrated solution, we can achieve a single source of data, redundant work processes are eliminated, while communication and accuracy are enhanced.

Meanwhile, generation of reports can also be streamlined, thus relieving our staff from mundane tasks, which allows them to focus on higher value work. The synergy between technology, effective business processes and a collaborative work environment has enabled us to drive for effective project control and higher productivity.

4. What trends do you envisage in the use of 4D and 5D BIM in the near future?

4D and 5D BIM has been growing in use internationally for several years. We envisage the industry adopting 4D, 5D and the other dimensions and capabilities of BIM, and extending their use in the lifecycle of project management to multiply BIM’s value over the next few years.

With the growing need for organisations in our industry to consolidate full data onto a single platform, we can also imagine cloud technology becoming very useful in this integration, and with that, the collaborative potential of BIM will grow even more.

Future Trends: 4D and 5D BIM

These powerful tools are not just for engineers and contractors. They are also good for homeowners and users of buildings. With 4D BIM, individual 3D components or assemblies are linked with the project delivery timeline to better plan, control and manage resources such as manpower and equipment. 4D simulation also provides opportunities for improved collaboration and forecasts and tracking of resources and time.

5D BIM integrates design with scheduling, estimating and costing, which includes generating the bills of quantities and control, and managing and monitoring project costs.

4D and 5D BIM are powerful tools for cost control over projects. Estimation capabilities will be enhanced and operational staff had to adapt their BIM processes to collaborate with the departments involved in contracts and costing.

With a growing need for organisations in our industry to consolidate full data onto a single platform, we can also imagine cloud technology becoming very useful in this integration, and with that, the collaborative potential of BIM will grow even more.

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BEING BIM-READY FOR THE FUTURE
Students trained in the technology and professors give their take on BIM learning in Singapore

With BIM touted as one of the key technologies to improving productivity and integration across the entire construction value chain, the demand for BIM-equipped and BIM-skilled resources by the construction industry has also increased. To meet the demand and build BIM capability, many institutes of higher learning (IHLs) in Singapore have incorporated BIM technology into their programmes since 2011. The latest IHL to do so is the Singapore University of Technology and Design (SUTD).

Building Technology-oriented Leaders in Design
Assistant Professor Stylianos Dritsas and Associate Professor Bige Tuncer SUTD tell us about having BIM in the varsity’s curriculum.

1. How would you describe SUTD’s Design, Architecture and Sustainable Design programme? What motivated SUTD to include BIM technology in its undergraduate programme? SUTD’s undergraduate curriculum was developed in collaboration with the Massachusetts Institute of Technology. As such, the role of technology is pervasive within our programme.

The programme comprises four thematic areas: Architectural Design, Building Technology, Design Computation and History, Theory and Culture. Design Computation is the overarching area that studies Information Technologies in architectural praxis and includes four compulsory courses, of which BIM is one of them.

2. Can you elaborate on the BIM course? The BIM course is the last core Design Computation module. In the previous courses, students have already built significant knowledge and experience in computer programming, computational geometry, parametric modelling, and computer-aided design and manufacturing, which are prerequisites to the introduction of BIM.

In addition, their understanding has reached a level where we can effectively engage in high-level topics such as integration of trades and services, project coordination and cross-disciplinary collaboration, and architectural design-development and documentation through the paradigm of BIM.

3. How is the course delivered so it is relevant and engaging to students? We do not have traditional boundaries between design and technical courses. This design allows students to engage in students in employing new modes of thinking and working to approach personalised objectives and challenges through design. The BIM topic is covered through a series of lectures including inviting industry experts from the architecture, engineering and construction industry as well as government agencies. We also engage in project-based sessions where students develop their own design-to-production processes.

4. What skillsets do students need to have to better meet the changing needs of the construction industry? As much as BIM has become the status quo today, we foresee advanced scientific modelling methods such as numerical simulation and optimization of human, building and environmental parameters to be the next major innovation towards a more sustainable future.

Riding the Wave of BIM
Graduates Goh Chia Yee (CY) and Ma Ming Ze (MZ) from the Mechanical Engineering (Green Building Technology) diploma programme, Xiao Yang Hao (YH) from Construction Information Technology diploma programme, and Wang Ning Qian (NQ) from Design (Interior & Landscape) diploma programme may have been enrolled in different courses at BCA Academy, but they have all been exposed to BIM-related modules and found it very practical in applying them to their current jobs. CY and MZ learnt to model basic mechanical systems using BIM while studying the design and construction of energy-efficient mechanical and electrical systems. YH’s Construction IT course focuses on all things BIM while NQ learnt to visually communicate conceptual ideas and integrate design with BIM.

1. How does being a graduate from the BCA Academy give you an added advantage to securing your current job? Is the remuneration package what you had expected?

CY: I was fortunate to be employed with the real estate division of a landmark developer. The BIM exposure we had definitely helped to convince Woodland Construction that we are capable of handling BIM tasks.

YH: As BIM becomes more prevalent in Singapore, the BIM knowledge we learnt in school was definitely an advantage in helping us secure our current jobs quickly.

ALL: Yes, we are all happy and satisfied with the remuneration package we are getting!

2. Can you give some examples of how your BIM knowledge has helped you at work?

CY: BIM basics were extensively covered during my course in the Academy and, coupled with fundamental systems knowledge from other modules, helped me to pick up soft knowledge and work mechanics faster than my peers.

MZ: I’m especially grateful to my lecturers for allowing me the ropes. They provided me with a strong foundation in BIM modelling that enabled me to deliver at work.

YH: The BIM basics helped me to further master other BIM related software such as Navisworks. This has given me an advantage over my peers in terms of job performance.

ALL: I was given a solid foundation in BIM and I’m able to apply my architectural BIM knowledge to my area of work.

3. What is your current job scope or portfolio?

CY: I graduated from the NUS Project Facilities Management (PFM) (Honours) Programme. PFM students read modules related to both facilities management and project management rather than just one particular discipline.

Throughout the four years, students are exposed to BIM progressively. They learn about time management and principles of project scheduling (related to 4D), quality surveying and cost estimating (ISO) and facilities management (ISO). We are required to apply all this knowledge in a BIM model offered in the final year.

ALL: In addition, there are various BIM competitions and overseas exposure. The mentorship programme introduced by BCA during the 2014 BIM Competition helped me to gain valuable experiences and lessons.

4. Can you give some examples of how your BIM knowledge has helped you at work?

CY: Knowledge of BIM means I can provide more value-added services to my work, and this will definitely be an advantage in helping me secure my current job.

NQ: I was given the opportunity to use 4D visualisation in an engineering project during my final year. I was able to use BIM technology to visualise the construction of a building and make realistic predictions of cost and time.

ALL: Definitely an advantage in helping us secure our current jobs quickly.

5. Do you have any advice for those who aspire to take up a career in BIM technology?

NQ: BIM isn’t just about modelling. It is also about the information that goes into the building. Come up with new ways to make use of that information and you will derive more satisfaction from doing BIM.

YH: BIM is an upcoming trend. Grab the chance and ride the wave!

CY: Do try and take part in as many BIM competitions as possible to maximise your BIM exposure. You can also make great friends that will spur you on in your BIM journey.

ALL: BIM technology is evolving at a very fast pace. No one can keep up with the technology on their own. If you are serious about BIM, we advise you to network with other professionals and attend BIM workshops to keep up with the latest developments.

From left: Ming Ze, Chia Yee, Yang Hao and Ning Qian. All of them graduated from the BCA Academy and are now working with Hexacon Construction.
BIM COMPETITION 2015 GOES INTERNATIONAL

Students from Singapore, Korea, Australia and Turkey pit their skills against one another

BCA’s annual BIM Competition opened its doors to international participation in 2015. It saw yet another round of excellent BIM skills displayed by student teams – this time not just from Singapore, but also Korea, Australia and Turkey. Up to 149 students from 21 teams took up the challenge.

The International BIM Competition 2015 aimed to familiarise students with new game-changing technologies – such as DfMA – through the competition projects. The teams demonstrated their BIM competency while partnering industry BIM Managers, who acted as mentors. The mentorship included site visits to the mentor’s office to experience first-hand how BIM can be used for actual projects.

At the start of the competition, the teams were given the relevant documents and templates, and they had to electronically submit their work in stages. Various deliverables were required for submission daily. A total of six teams out of 21 were finally shortlisted for the final presentation and judging component. The panel of judges consisted of five industry experts in the fields of BIM and DfMA.

1st Prize: Victorious Secret
Singapore Polytechnic, Singapore

Victorious Secret adopted the core idea of the unitized building system, which is built on the flexibility and innovation of modularisation construction using BIM. From the basic analysis, the team was able to draw conclusive decisions, aiding the project management and construction simulation.

Considerations for sustainability helped to improve the overall building performance. For them, BIM is a platform for innovation that can test the limits of structural building.

Mr Adam Jordan, Associate, Bryden Wood Singapore

“...It has been very exciting to see such accomplished and enthusiastic work from students here in Singapore as well as from around the world. The quality of the submissions was very high and it is clear that all of the finalists did a great job. As Singapore and other countries continue on their construction productivity journey, it’s heartening to see that students who will soon enter the built environment professions have already acquired a strong grounding in BIM and DfMA approaches. They are well placed to help the industry achieve greater things.”

2nd Prize: Easy Builder
Chosun University, South Korea

Easy Builder used a modular unit construction method for all floors except the first and second, which are shared spaces. For their construction sequencing, they proposed to erect the structural frame while simultaneously inserting the module unit into the structure using the Infill method. This reduces costs and the construction period, and enhances structural safety.

For disaster prevention, the eccentrically braced frame (EBF) with removable link was used. Post-disaster, the damaged parts can be replaced without affecting the building’s function. The Modelling Automation Model was made with open API using Tekla as the EBF system is not within the BIM software.

Mr Ding Zi Chen
Team Leader, Victorious Secret

“The team believes that BIM is a platform for design and the core knowledge is still in DfMA itself. We spent a lot of time on the DfMA component when the topic was released. We had already prepared and done our BIM research before the start of the competition. We strongly believe that having a good grasp of BIM knowledge is crucial in applying it to the actual construction project.”

3rd Prize: BI-BIM
Kyung Hee University, South Korea

Merit Prizes

<table>
<thead>
<tr>
<th>Award</th>
<th>Team Name</th>
<th>Institution, Country</th>
</tr>
</thead>
<tbody>
<tr>
<td>1st Prize</td>
<td>Victorious Secret</td>
<td>Singapore Polytechnic, Singapore</td>
</tr>
<tr>
<td>2nd Prize</td>
<td>Easy Builder</td>
<td>Chosun University, South Korea</td>
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<tr>
<td>3rd Prize</td>
<td>BI-BIM</td>
<td>Kyung Hee University, South Korea</td>
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<td>Merit Prizes</td>
<td>BIMETU</td>
<td>Middle East Technical University, Turkey</td>
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<tr>
<td></td>
<td>Bravo Builder</td>
<td>BCA Academy, Singapore</td>
</tr>
<tr>
<td></td>
<td>Evolution</td>
<td>BCA Academy/Singapore University of Technology &amp; Design, Singapore</td>
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<td>Fortitude Inc</td>
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<tr>
<td></td>
<td>Team UNSW</td>
<td>The University of New South Wales, Australia</td>
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Winners

1st Prize: Victorious Secret
Singapore Polytechnic, Singapore

2nd Prize: Easy Builder
Chosun University, South Korea

3rd Prize: BI-BIM
Kyung Hee University, South Korea

Merit Prizes

BIMETU
Middle East Technical University, Turkey

Bravo Builder
BCA Academy, Singapore

Evolution
BCA Academy/Singapore University of Technology & Design, Singapore

Fortitude Inc
BCA Academy/Singapore University of Technology & Design, Singapore

Liaison
BCA Academy/Singapore University of Technology & Design, Singapore

Team UNSW
The University of New South Wales, Australia

All smiles for the winning team, Victorious Secret from Singapore Poly
# CALENDAR OF EVENTS

<table>
<thead>
<tr>
<th>Date/Time</th>
<th>Event Name</th>
<th>Venue</th>
<th>Organiser</th>
<th>Contact Person &amp; Details</th>
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<tr>
<td>15 Apr 2016</td>
<td>BCA – SCAL Productivity Clinic</td>
<td>Construction House, 3 Bukit Merah Lane 2, Singapore 159760</td>
<td>BCA and Singapore Contractors Association Limited (SCAL)</td>
<td>Name: Mr Harry Chua Tel: 6278 9577 Email: <a href="mailto:harry@scal.com.sg">harry@scal.com.sg</a></td>
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<td>29 Apr 2016</td>
<td>Smart Builders Leadership Series</td>
<td>BCA Academy</td>
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<td>Name: Ms Ezrin Raof Tel: 6804 4255 Email: <a href="mailto:ezrin_raof@bca.gov.sg">ezrin_raof@bca.gov.sg</a></td>
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<td>20 Apr 2016</td>
<td>Basic Concept in Construction Productivity Enhancement</td>
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<td>30 &amp; 31 May 2016</td>
<td>Workshop Series on Lean Construction Management: Managing Workflow and Achieving Plan Reliability</td>
<td>BCA Academy</td>
<td></td>
<td>Tel: 6248 9999 Email: <a href="mailto:bca_academy@bca.gov.sg">bca_academy@bca.gov.sg</a></td>
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<tr>
<td>9 – 12 May 2016</td>
<td>Certification Course in BIM Modelling (MIF Track)</td>
<td>BCA Academy</td>
<td></td>
<td>Tel: 6248 9999 Email: <a href="mailto:bca_academy@bca.gov.sg">bca_academy@bca.gov.sg</a></td>
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<tr>
<td>16 – 19 May 2016</td>
<td>Certification Course in BIM Modelling (Structure Track)</td>
<td>BCA Academy</td>
<td></td>
<td>Tel: 6248 9999 Email: <a href="mailto:bca_academy@bca.gov.sg">bca_academy@bca.gov.sg</a></td>
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<td>3 – 6 May 2016</td>
<td>Certificate Course in BIM Management</td>
<td>BCA Academy</td>
<td></td>
<td>Tel: 6248 9999 Email: <a href="mailto:bca_academy@bca.gov.sg">bca_academy@bca.gov.sg</a></td>
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<tr>
<td>23 &amp; 24 May 2016</td>
<td>BIM Planning Course (Building Developers and Facility Managers)</td>
<td>BCA Academy</td>
<td></td>
<td>Tel: 6248 9999 Email: <a href="mailto:bca_academy@bca.gov.sg">bca_academy@bca.gov.sg</a></td>
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<tr>
<td>25 Jul 2016</td>
<td>Specialist Diploma in Design for Manufacturing &amp; Assembly</td>
<td>BCA Academy</td>
<td></td>
<td>Tel: 6248 9999 Email: <a href="mailto:bca_academy@bca.gov.sg">bca_academy@bca.gov.sg</a></td>
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<tr>
<td>27 Jul 2016</td>
<td>Specialist Diploma in Lean Construction</td>
<td>BCA Academy</td>
<td></td>
<td>Tel: 6248 9999 Email: <a href="mailto:bca_academy@bca.gov.sg">bca_academy@bca.gov.sg</a></td>
</tr>
<tr>
<td>22 Jul 2016 – 24 Sep 2016</td>
<td>BCA-SMU-WDA Advanced Management Programme on Productivity and Leadership Development</td>
<td>SMU, BCA, WDA</td>
<td></td>
<td>Tel: 6248 9999 Email: <a href="mailto:bca_academy@bca.gov.sg">bca_academy@bca.gov.sg</a></td>
</tr>
</tbody>
</table>

# CONSTRUCTION PRODUCTIVITY AND CAPABILITY FUND (CPCF) COURSES

- Certificate in Interior Finishing Coordination
- Certificate in Pavement Construction and Maintenance
- Certificate in Precast Concrete Construction Supervision
- Certificate in Waterproofing Supervision
- Certificate in Building Measurement
- Certificate in Geotechnical Instrumentation for Supervisors
- Certificate in Levelling and Setting Out
- Certificate Course for Structural Steel Supervisors
- NBQ in Project Supervision
- Higher NBQ in Project Supervision
- Advanced NBQ in Project Supervision
- NBQ in Supervision and Coordination of M&E Works
- Higher NBQ in Supervision and Coordination of M&E Works
- Advanced NBQ in Supervision and Coordination of M&E Works
- NBQ in Operation & Maintenance
- Higher NBQ in Operation & Maintenance
- Advanced NBQ in Operation & Maintenance

The additional courses are:
- Certificate courses (PMETs)
- Certificate course in BIM Modelling
- Certificate course in BIM Management
- Project Management for Professionals in the Building and Construction Industry (in collaboration with SPM)
- Construction Productivity Management (in collaboration with SCAL)
- Design of Precast Concrete Structures for Engineers
- Workshop on Site Management of Precast Concrete Construction
- Trade Diplomas (Foremen / Supervisors)
- Structural Steel Supervision
- Reinforced Concrete Supervision
- Plumbing Technology
- Electrical Technology
- Certificate courses (Tradesmen / Foremen)
- Builders Cert in Plumbing and Pipelitting
- SEC(K) in Precast Concrete Components Erection
- SEC(K) in Structural Steel Fitting
- SEC(K) in Interior Drywall Installation
- System Formwork Training
- Mechanical Elevated Work Platform

FOR ENQUIRIES, PLEASE CONTACT:

BCA ACADEMY
TEL: 6248 9999 EMAIL: bca_academy@bca.gov.sg
CONSTRUCTION PRODUCTIVITY AND CAPABILITY FUND (CPCF)

**WORKFORCE TRAINING AND UPGRADING (WTU) SCHEME**
Facilitates upgrading of workforce at all levels by co-funding up to 90% of the cost for selected skills assessment and training courses*

**MECHANISATION CREDIT (MECHC) SCHEME**
Provides assistance to builders to defray up to 70% of equipment costs*

**PRODUCTIVITY INNOVATION PROJECT (PIP) SCHEME**
Provides assistance to companies to defray up to 70% of the cost for adopting more productive work processes*

**SCHOLARSHIP AND SPONSORSHIP PROGRAMMES**
In partnership with built environment firms, BCA will co-fund scholarship and sponsorship programmes at the undergraduate, diploma, ITE, supervisory and foreman levels*

**BUILDING INFORMATION MODELLING (BIM) FUND**
Co-funds up to 70% of the supportable cost incurred by firms when leveraging BIM technology to improve multi-disciplinary collaboration*

*Terms and conditions apply.

For more information, please visit [www.bca.gov.sg/CPCF/cpcf.html](http://www.bca.gov.sg/CPCF/cpcf.html)

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*Building and Construction Authority*

We shape a [safe, high quality, sustainable and friendly](#) built environment