

MEDIA RELEASE

BIM TECHNOLOGY PAVES THE WAY FOR GREATER INDUSTRY COLLABORATION

- Inaugural BIM Mobile Apps Competition draws creative solutions for construction site management

- Multi-disciplinary category in the BIM Competition opens up for international participation

Singapore, 31 July 2013 – The Building and Construction Authority (BCA) has organised a new competition to encourage more innovative ideas on mobile applications to help building professionals and owners collaborate better with Building Information Modelling (BIM).

2. The inaugural BIM Mobile Apps Competition was held over two months with eight teams submitting written proposals, six of whom continued to develop their ideas into prototypes.
3. The winning team from Woh Hup (Private) Limited created a live communication platform between the BIM engineer, site engineer and precaster, to update and retrieve information related to precast components anywhere and anytime. This helps to reduce costly project delays, as all parties can easily track information on the detailing of precast components, construction sequences, production scheduling and quantities of components used.
4. Another mobile application developed by multi-disciplinary design firm ONG&ONG Pte Ltd was designed specifically for BIM managers to better manage BIM projects as it enables them to resume their day to day activities on-the-go. Some functions include location based project search and updating, as well as integration to the BIM authoring software Autodesk Revit.
5. Furthermore, students from the BCA Academy developed a mobile application to provide contractors with the information required to make informed and timely decisions, to ensure that there are adequate materials at every stage of the construction. For instance, once the materials are delivered to site and used for

construction, the site manager can check the components on the checklist, and synchronise the information through cloud technology, to keep others updated.

6. This is also the first year BCA has opened its annual BIM competition for international participation. Entries from 37 teams were submitted, out of which 8 were from overseas like Korea and the United Kingdom.

7. The competition required teams to design and develop a new mixed development comprising a convention and exhibition centre and commercial shopping area at the existing Singapore Expo using BIM. Besides designing to meet the local building regulations, the teams would also have to use BIM creatively to ensure the development is buildable and incorporates environmentally-friendly design technologies to meet a minimum green building standard, within 48 hours.

8. Team Vertical, the winner of the Education (Architecture) category, decided to push the limits of BIM by creating new experimental forms supported by scientific analyses. The team, which consisted of undergraduate and alumni students from the National University of Singapore, Singapore Polytechnic and BCA Academy had used BIM to understand how the geometry of the building affects its performance in different ways.

9. For example, through simulations of different BIM models, they designed a roof made up of a series of curves, allowing wind to be channelled into the common spaces beneath at regular intervals. Its natural curvature also allowed structural members to be reduced, improving aesthetics as well as cost-effectiveness. Their key to winning was having all members, even those from as far as Hong Kong and China, utilise open collaborative workflows.



Perspective illustration of the new Singapore Expo, proposed by Team Vertical

10. “We are encouraged to receive overwhelming response from Singapore and overseas for both BIM competitions. BCA has identified BIM as a game changer for

the built environment sector due to its potential in integrating the construction value chain for process and productivity improvements. We will continue to promote BIM through such competitions in our schools and the industry,” said Dr John Keung, CEO of BCA.

11. Competition entries will be on display at the Singapore Expo Max Atria this week. Winners of both competitions also received their prizes from Deputy Prime Minister and Minister for Finance, Mr Tharman Shanmugaratnam at the opening ceremony of the Singapore Construction Productivity Week today.

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About BCA

The Building and Construction Authority (BCA) of Singapore champions the development of an excellent built environment for Singapore. BCA's mission is to shape a safe, high quality, sustainable and friendly built environment, as these are four key elements where BCA has a significant influence. In doing so, it aims to differentiate Singapore's built environment from those of other cities and contribute to a better quality of life for everyone in Singapore. Hence, its vision is to have "the best built environment for Singapore, our distinctive global city". Together with its education arm, the BCA Academy of the Built Environment, BCA works closely with its industry partners to develop skills and expertise that help shape the best built environment for Singapore. For more information, visit www.bca.gov.sg.

BIM Factsheet

Internationally, Building Information Modelling (BIM) has been identified as one of the key technologies that will transform the construction industry. In Singapore, the Construction Productivity Roadmap has also identified BIM as a key technology to improve the construction productivity as well as the level of integration and collaboration across the various disciplines in the construction value chain.

About BIM

Building Information Modelling (BIM) is a three-dimensional (3-D) modelling technology that allows the building professionals of various disciplines (architects, structural engineers, structural professionals, M&E engineers and contractors) to explore the building project digitally through an integrated process, before it is even built.

- BIM models and manages not just graphics, but also information – drawings and reports, design analysis, schedules and facilities management – which allows the building team to make better-informed decisions.
- It allows architects, engineers and contractors to share information throughout the project lifecycle to analyse and resolve potential design clashes before construction begin.
- BIM will facilitate better teamwork among the professionals, helping to reduce unnecessary reworks when the project is being constructed.

BCA's BIM Roadmap

BCA has set up the Centre for Construction IT (CCIT) in 2010 to help the construction industry embrace BIM to enhance its productivity and level of integration. A BIM Roadmap was formulated in 2010 to have 80% of the construction industry use BIM by 2015.

In 2011, an industry-led BIM Steering Committee was set up to guide the implementation of the BIM Roadmap. The progress of the Roadmap is also being reviewed by the BIM International Panel of Experts once every two years. BIM Manager Forums were also being set up to solicit and advice on implementation issues.

In the BIM Roadmap, the various key thrusts below were identified to address the challenges faced by the industry when migrating from 2-D CAD to a 3-D BIM platform.

BCA Measures to Facilitate the Adoption of BIM Across the Industry:

A. PUBLIC SECTOR TAKING THE LEAD

- Collaborate with government procurement entities (GPEs) to request the use of BIM for their projects starting from July 2012;
- Housing Development Board, Land Transport Authority, Ministry of Education, Peoples' Association, Ministry of Health Holdings, Defence Science & Technology Agency, National Environment Agency, Building and Construction Authority, National University of Singapore, Nanyang Technological University, Singapore Sports Council, Changi Airport Group etc. are using BIM for their projects.

B. REGULATORY APPROVAL

- Work with government regulatory agencies to accept BIM e-Submissions for regulatory approvals in phases, starting from July 2013.
- Architectural BIM e-submission for GFA > 20000 square metres from July 2013
- Engineering BIM e-submission for GFA > 20000 square metres from July 2014
- All BIM e-submission for GFA > 5000 square metres from July 2015

C. BUILDING CAPABILITY & CAPACITY

C1. RAISING INDUSTRY AWARENESS

- To increase BIM awareness, various seminars, workshops and conferences on the use of BIM had been organised for the industry to understand the benefits of the technology;
- BCA also encourages the formation of user self-help groups to share their BIM experience and create a bigger voice when dealing with the BIM vendor.
- BCA also organises events such as the BIM Competition and BIM Mobile Apps Challenge as part of the Singapore Construction Productivity week to showcase and demonstrate the value of BIM. These competitions have

attracted strong participation from local and international firms as well as Institutes of Higher Learning (IHLs).

C2. EQUIPPING THE EXISTING INDUSTRY PROFESSIONALS AND YOUNG GENERATIONS WITH BIM SKILLS

- Since 2011, the BCA Academy has been offering various BIM courses to equip industry professionals with the necessary know-how in BIM. Courses include:

- BIM Planning for Client and Facility Managers
- BIM Management
- BIM Modelling (covering Architectural, M&E and C&S disciplines)
- Specialist Diploma in BIM (a five month in-depth course to train BIM managers and coordinators)

More than 1000 industry professionals have attended the above courses.

- Collaborate with the various IHLs to include BIM training in their curricula so as to equip the new entrants to the industry with the necessary BIM skills;
 - Almost all building related courses from various IHL (BCA Academy, ITE, Singapore Polytechnic, Temasek Polytechnic, Ngee Ann Polytechnic, National University of Singapore, Nanyang Technological University, UniSIM, and Singapore University of Technology and Design) have included certain components of BIM training.
 - Today BIM is taught at ITE, Diploma, Bachelor and Master degree levels.
 - Approximately more than 2000 students are trained in BIM each year.
 - Final year students from BCAA are also involved in modelling work of actual projects to sharpen their BIM skills. Some of the participating firms have offered jobs to the students after the projects.
- BIM vendors also play important roles in providing BIM training. Besides conducting training courses, they are also providing consultancy clinic and in-depth workshops. Today more than 3400 industry professionals have been trained by them.

- CCIT provides training & chaperon services to:
 - the officers of various Regulatory Agencies and Government Procurement Entities to equipment them with the necessary BIM know-how to process the BIM submitted to them.
 - companies embarking on their first BIM project or regulatory submission.
 - share BIM good practices and experiences with local practitioners via the BIM@SG website

D. INCENTIVISING BIM ADOPTERS

- BCA has also made available part of the S\$250 million Construction Productivity and Capability Fund (CPCF) to help firms defray the costs for BIM adoption (in terms of training, consultancy services and costs of hardware and BIM software).
- Firms are given up to six times to apply for the BIM fund so as to give them ample opportunities to develop their BIM skill set by involving in actual BIM projects.
- Firms can either apply for the firm specific scheme or project collaboration scheme. The latter allows them learn how to operate in a multi-party environment.

Moving Forward – Researching future BIM applications

CENTRES OF EXCELLENCE (COE) FOR BIM RESEARCH

- To prepare our BIM adaptors beyond the immediate requirements, BCA will collaborate with the National University of Singapore (NUS) & Nanyang Technological University (NTU) to set up Centres of Excellence (COE) for BIM Research. The COE will focus on applied BIM R&D and advanced training programmes for the industry.
- BCA will work with the COEs to identify potential applied BIM R&D projects that will benefit the industry and address some of the inefficiency in the construction

value chain. Subsequently BCA and COE will jointly approach potential sponsors to involve them in the projects.

▪ **NUS Centre of Excellence in BIM**

- The NUS BIM Centre of Excellence (COE) will assist the local construction industry to achieve productivity improvement by transforming the way people design, deliver and manage the built environment through BIM innovation and practice, working with local stakeholders as well as international collaborators.
- The potential research topics identified by NUS are follows:
 - BIM for Safety: sponsored by the Workplace Safety and Health Council
 - BIM for Developer: sponsored CapitaLand, HDB and URA
 - BIM for Process Transformation: Sponsored by BuildingSmart Singapore
 - BIM with GIS: Sponsored by SISV LS Div and SLA

▪ **NTU Centre of Excellence in BIM**

- NTU has developed a Framework and Roadmap to enhance the BIM capability of the construction industry in Singapore. As part of this Roadmap, it aims to achieve a 20% minimum in productivity improvement of the construction firms participating in their BIM research projects.
- The potential research topics identified by NTU are follows:
 - BIM for Precast: sponsored by HDB
 - BIM for MEP Sub-contractors: sponsored Samsung CT, Autodesk and STAS
 - BIM for Structural Steel: sponsored by Telka
- To date, BCA has worked with NTU to secure the HDB sponsored project “Enhancing the Process of Preparing Precast Shop Drawings through BIM”. BCA is also working with NUS to secure the CapitaLand sponsored project “Development of an Automatic Layout and Feasibility Checking System for Residential Projects”.

OTHER APPLICATIONS

- BCA is also working with vendors to develop BIM add-ons (e.g. Concrete Usage Index and Buildability Score) and mobile applications.