

## **MEDIA RELEASE**

### **BCA IDENTIFIES 35 KEY TECHNOLOGIES FOR R&D TO DRIVE CONSTRUCTION PRODUCTIVITY IN THE NEXT LAP**

- Productivity requirements for more Government Land Sale sites among new measures to further drive productivity in the built environment sector

**18 Oct 2016** – The Building and Construction Authority (BCA) has developed a construction productivity research and development (R&D) roadmap to identify new knowledge, process and technology areas for development, adaptation and adoption in Singapore’s built environment sector.

2. Under the roadmap, 35 key technologies under seven R&D clusters were identified to enable the built environment sector to change the way we build and sustain productivity improvements in the long term. These areas include Design for Manufacturing and Assembly (DfMA), automated equipment and robotics, info-comm technology, Building Information Modelling (BIM) and Virtual Design and Construction (VDC), 3D printing, advanced construction materials and productive solutions for civil engineering works.

3. More than 400 stakeholders from the industry, public agencies, institutes of higher learning and research institutes were consulted for the roadmap.

4. Dr John Keung, CEO of BCA, said that the built environment sector needs to constantly develop and harness innovations and new technologies to improve construction productivity and resource efficiency, given the tightened manpower in the sector. By changing the way we build, it will also create better jobs in the sector.

5. “Going forward, BCA plans to seek the necessary funding to support R&D in the built environment sector. We will also study the roadmap in greater detail to identify priority and value added areas for R&D. To enable research to be implemented in

actual construction projects, it is critical to build R&D capabilities in our construction firms through partnership with universities and research institutes,” he said.

6. Separately, BCA has awarded a total of S\$2 million to four projects under an inaugural grant call for construction productivity under a research fund by the Ministry of National Development. These research projects will focus on solutions to drive DfMA in the sector, with as much on-site construction works shifted to off-site prefabrication and automation in a factory environment, as well as improving integration across the construction value chain. Please refer to **Annex A** on the four projects.

7. At the opening ceremony of the Singapore Construction Productivity Week, Minister for National Development and Second Minister for Finance, Mr Lawrence Wong also shared upcoming measures to further improve productivity in the built environment sector.

8. More Government Land Sale (GLS) sites will be required to adopt productive construction methods like Prefabricated Pre-finished Volumetric Construction, where entire flats complete with internal finishes and fittings are constructed off site before they are transported to site for installation. The Government will also look into specifying productivity outcomes for GLS sites without mandating specific technologies and improving upstream collaboration between developers, architects and contractors to reduce reworks downstream.

9. To help firms improve collaboration and enhance the construction management process, BCA will be launching the Codes of Practice (CoP) for BIM e-submission this month. BCA will work towards making the CoP mandatory for building and structural plan submissions in the future.

10. The CoP guides the industry on standardising the type of information to include in their BIM submissions and will greatly improve the efficiency in which regulatory agencies check plan submissions. It will also facilitate information exchange across the various building disciplines, thereby helping firms to identify and address problems upfront before construction.

11. Lastly, there will be more emphasis on productivity in BCA’s 9th Edition of the Construction Quality Assessment System (CONQUAS), where firms will be recognised

for adopting productive technologies and materials. Please refer to **Annex B** on the CONQUAS 9<sup>th</sup> Edition.

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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 "a future-ready built environment for Singapore". 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 a future-ready built environment for Singapore. For more information, visit [www.bca.gov.sg](http://www.bca.gov.sg).

**ANNEX A:**

	<b>Project Title</b>	<b>Synopsis</b>
1	<p><b>Smart Corrosion Protective Coatings for Prefabricated Pre-finished Volumetric Construction (PPVC) Structures</b></p> <p>By: SIMTech, A*STAR</p>	<p>This project involves the development of coloured single-coat zinc coating or a compatible two-coat system (with coloured top coat) with ease of application and development of “smart coatings” with encapsulated inhibitors for additional corrosion protection of critical parts and locations.</p>
2	<p><b>Understanding Fire Resistance and Termite Protection of Softwood Based on CLT in Tropical Conditions</b></p> <p>By: NTU</p>	<p>To understand and make advances in the usage of softwood for both CLT and Glulam in Singapore construction technologies, this project explores a multi-disciplinary strategy to accommodate both fire and termite protection.</p>
3	<p><b>Innovative Mass Timber Construction Systems for High-density Urban Environment in the Tropics</b></p> <p>By: NUS</p>	<p>The aim of this proposed research is to formulate a reference guideline to design Mass Timber Construction System (MTC) in the tropics, identifying the areas in which the building industry and the timber supply chains can be transformed in the next 5-10 years.</p>
4	<p><b>Development of EUROCODE-compliant Innovative and Purpose-Built Solution for Precast Element Design</b></p> <p>By: NTU</p>	<p>The primary objective of this research is to develop the solution to equip the Precast Design Engineers with an effective tool to perform EUROCODES-compliant precast element design holistically and quickly. The solution will empower engineers to easily automate repetitive structural design computations and cope with changes encountered in building projects.</p>

## **ANNEX B:**

### **CONQUAS 9th Edition**

The Construction Quality Assessment System (CONQUAS) was introduced in 1989 to measure the workmanship quality achieved in a new building project. Since then, it has undergone various changes to improve the system of quality assessment.

CONQUAS standards are constantly evolving, due to changes and improvements in processes and technology. There is a need to align it with industry trends to keep it current and relevant. The CONQUAS 9<sup>th</sup> edition is aimed at strengthening the existing scheme / criteria to better promote and recognise the synergies between productivity and quality. It was developed with two main objectives:

- Promote the adoption of Design for Manufacturing and Assembly (DfMA) which supports both quality and productivity; and
- Ensure the CONQUAS score will be commensurate with end-users' expectations on workmanship quality

#### **1. Promote the adoption of DfMA which supports both quality and productivity**

For this edition, more bonus points will be awarded to projects to further encourage the use of prefabrication technologies and productive materials, which lead to higher quality and productivity. This supports the productivity drive in the built environment sector and recognises the efforts of builders who adopt less labour-intensive design and material choices. These include the use of prefabricated pre-finished volumetric construction, prefabricated bathroom unit, mass engineered timber such as cross laminated timber/glued laminated timber and productive materials such as engineered wood and vinyl flooring.

#### **2. Ensure CONQUAS Score will be commensurate with end-users' expectations on workmanship quality**

Architectural trades are more visible to end-users as compared to structural works. As a result, most complaints concern finishing works. Thus the 9th edition places higher emphasis on architectural works with an increase in the scoring weightage by 15% and a reduction by a similar percentage for structural and mechanical & electrical works. In addition, a homeowners' survey and data analysis revealed that end-users are more

concerned with ceiling, door and window elements among the architectural trades, particularly accessories defect, functionality and unevenness. Hence, the weightages of the quality standards for these elements have been adjusted accordingly to align with end-users expectations.

To further enhance the robustness of the CONQUAS score, scoring under the 9<sup>th</sup> edition will now take into consideration major defects (e.g. water seepages through wall/window, inter-floor leakages, functionally deficient doors/windows etc.) detected during the internal finish assessments. The scoring will be adjusted to better reflect the severity of these major defects. Adverse feedback from end-users on major defects that surface during the defects liability period of a project will also be considered when finalising the CONQUAS score.