

# Pillars

WE SHAPE A **SAFE**, **HIGH QUALITY**, **SUSTAINABLE** AND **FRIENDLY** BUILT ENVIRONMENT | ISSUE 04/JULY–AUGUST 2013



# Pillars

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## BREAKING NEW GROUNDS

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Dear Readers,

In this day and age, change is indeed the only constant. This is evident in our built environment sector, where construction has long been viewed as a male-dominated industry—not without good reason, as it can be a work environment that is extremely physically daunting. But in recent years, we have seen more women making their mark in the construction industry, marking the start of a paradigm shift in perceived gender roles in our sector.

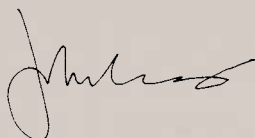
This month's issue carries an inspiring story about Singapore's first certified female Quality Mark Manager, Ms Suria Binte Abdul Rahman, Assistant Manager (QA/QC) from Straits Construction Singapore Pte Ltd. Ms Suria is one of the 31 certified Quality Mark and CONQUAS Managers in Singapore—an achievement in its own right.

Another positive change has been the built environment sector and BCA working together to care for the community. BCA recently collaborated with the Singapore Contractors Association Limited (SCAL) to extend a helping hand to those in need. Although it is nothing new to see BCA working hand-in-hand with industry partners in our CSR efforts, this time around these efforts have grown to one of the largest in scale, involving eight companies that came together to lend the equipment, resources, and manpower support that made the entire event possible.

Read more about how the strong support of various industry partners and friends, which I hope will be sustained through the years to come, makes such engagement a reality. We hope to encourage more built environment firms to work with us in giving back to our community.

Last but not least, you can also read about the new legislation that came into effect in the second half of 2013. It will see building owners having to fulfil three requirements under the Building Control Act, including achieving a minimum Green Mark standard for existing buildings when a cooling system is installed or retrofitted, carrying out a tri-yearly energy audit on building cooling systems, and submitting building information and energy consumption data annually.

This landmark move will make our city-state the first in the world to mandate minimum environmental sustainability standards for existing buildings, and will set us on the right path to create a more sustainable built environment in Singapore. **P**



Dr John Keung  
Chief Executive Officer



# QUALITY, SHE WROTE

HOME BUYERS' EXPECTATIONS FOR BETTER QUALITY HOMES HAVE BEEN RISING IN TANDEM WITH ESCALATING PROPERTY PRICES IN SINGAPORE. THE QUALITY MARK (QM) FOR GOOD WORKMANSHIP AND THE CONSTRUCTION QUALITY ASSESSMENT SYSTEM (CONQUAS) ARE TWO SCHEMES DEVELOPED BY BCA THAT PROVIDE ASSURANCE TO BOTH DEVELOPERS AND HOMEOWNERS ON THE WORKMANSHIP QUALITY OF PROJECTS/UNITS THAT ARE BUILT OR PURCHASED

To deliver quality projects, properly trained managers who understand quality standards and how to go about achieving them are needed. After training and appropriate experience, managers can be certified under the BCA Certified QM/ CONQUAS Manager Scheme. This scheme was launched in Jan 2007 and recognises engineers and other building professionals who play a leading and critical role in delivering high quality projects.

There are currently 31 Certified QM and CONQUAS Managers. Among them is the first female Certified Quality Mark Manager, Ms Suria Binte Abdul Rahman, Assistant Manager (QA/QC) from Straits Construction Singapore Pte Ltd. Let's hear what she has to say about her achievements.



*You are the first female Certified Quality Mark Manager. How do you feel?*

Delighted and surprised. I thank BCA for implementing the Certified QM/CONQUAS Manager Scheme. Besides equipping me with knowledge through quality courses and seminars, the scheme has also provided us with a platform for the recognition of the effort individuals put in to achieve projects of high quality. I also wish to thank all my fellow colleagues who have guided me, worked with me, and supported me along the way.

*After obtaining the Certification, how did your approach to your work (e.g. higher expectations, training of staff, etc.) change?*

The certification has definitely motivated me. The requirement for re-certification every three years has also kept me on my toes and ensured that I am able to perform consistently to maintain the certification. As a member of quality personnel with Straits Construction Singapore Pte Ltd, I play a role in instilling a culture of high quality in operations with my fellow colleagues. As a team, we will continue to improve the quality of our projects.

*How does being a Certified Quality Mark Manager help to position you and your company to achieve higher quality projects?*

To be certified as a Quality Mark Manager, I have to attend several courses, complete at least two QM projects, and attain the required CONQUAS score. The combination of knowledge obtained from the courses and on-site experience has helped to strengthen my understanding. Straits Construction Singapore Pte Ltd has also been supportive in sending me to these courses. With the launch of the CONQUAS 8<sup>th</sup> edition, bonus points are awarded for projects with certified CONQUAS and QM personnel. This will be an added advantage that will boost our CONQUAS scores.

*What advice would you give someone who wants to be a Certified Quality Mark or CONQUAS Manager?*

Using the certification requirements as a guideline, set your targets early and place yourself on your intended path. The phrase "Doing it right the first time" has been implanted in me since I was first introduced to CONQUAS, and it has stayed with me till now. The certification is an added bonus to the job satisfaction attained, and with an increase in your market value, why not? **P**

# GETTING INTO THE SCHEME OF THINGS

We hear you. So you want to be a Certified Quality Mark (QM)/CONQUAS Manager or Supervisor? Simply apply under the respective Schemes and get yourself on the right track. Both Schemes accord recognition to construction personnel who are instrumental in ensuring and delivering projects of high quality as reflected in high CONQUAS score projects.

The Manager Scheme is targeted at engineers and other building related professionals, including project managers on site.

The Supervisor Scheme is targeted at foremen and supervisors involved in site supervision activities.

## CRITERIA FOR RECOGNITION

Recognition will be at two levels: one general entry level (CONQUAS Supervisor or Manager) and another more prestigious level for high achievers (QM/CONQUAS Supervisor or Manager). The scheme allows for upgrading from one level to the other when the requirements are met.

Tables 1 and 2 outline the criteria for certification under the Schemes. The requirements for both Supervisor and Manager Schemes are closely similar except for entry qualifications, length of qualifying experience and for Managers, the need to attend the three-day Certified QM/CONQUAS Manager course at BCA Academy.

## MAINTAINING CERTIFICATION

To maintain the high standards of the Schemes, applicants must be able to demonstrate good performance consistently. Certificates issued are valid for 3 years only. Application for renewal should be submitted at least 2 months before the expiry of the certificate. The renewal criteria for CCQM, CQMM, CCQS and CQMS are as shown below:

	Certified CONQUAS Supervisor (CCQS) Certified CONQUAS Manager (CCQM)	Certified QM/CONQUAS Supervisor (CQMS) Certified QM/CONQUAS Manager (CQMM)
Minimum CONQUAS Score for at least 1 Project in the 3 Years Preceding the Expiry Date of the Certificate	80 points	83 points**

\*\*If the score is between 80 and 83 points, certification will be renewed as CCQS or CCQM respectively.

TABLE 1: QUALIFICATIONS AND EXPERIENCE

Title of Scheme	Certified CONQUAS Supervisor (CCQS) Certified QM/CONQUAS Supervisor (CQMS)	Certified CONQUAS Manager (CCQM) Certified QM/CONQUAS Manager (CQMM)
Qualifications	Possess any ONE of the following recognised qualifications: <ul style="list-style-type: none"> <li>WDA Employability Skills System Level 5 in Literacy and Numeracy (WPLN 5); or</li> <li>2 GCE "O" levels in English (G1-8) and Mathematics (G1-8); or</li> <li>2 GCE "N" levels in English (G1-5) and Mathematics (G1-5); or</li> <li>CITI Advanced Builder Certificate; or</li> <li>National Building Qualification (NBQ) in Project Supervision; or</li> <li>Construction Trade Foreman Certificate</li> </ul>	Possess any ONE of the following recognised qualifications: <ul style="list-style-type: none"> <li>University Degree or equivalent; or</li> <li>Polytechnic Diploma or equivalent</li> </ul>
Minimum Years of Construction Related Experience	5 years	5 years for Degree holders and 8 years for Diploma holders
Position/Designation	Foreman, Supervisor, Senior Foreman, Senior Supervisor	Engineer or above
	Complete CONQUAS training workshop for Developers/Consultants/Builders or customised CONQUAS training workshop	
	-	Complete Certified QM/CONQUAS Manager course

TABLE 2: PROJECTS COMPLETED AND PERFORMANCE


Title	Certified CONQUAS Supervisor (CCQS) Certified CONQUAS Manager (CCQM)	Certified QM/CONQUAS Supervisor (CQMS) Certified QM/CONQUAS Manager (CQMM)
Completed Good Industry Practices Guide workshops	At least 3 trades (Compulsory Trade: Waterproofing to Internal Wet Areas)	At least 6 trades [Compulsory Trades: Waterproofing to Internal Wet Areas, Aluminium Windows, Marble/Granite/Ceramic Tiling (counted as 2 trades) and Timber Flooring]
Minimum CONQUAS Projects Completed	2	2
Minimum Quality Mark Projects Completed	Not necessary	2
Minimum CONQUAS Score for at least 1 Project Completed in/after Year 2004	82 points	85 points

## BENEFITS OF SCHEMES

All CQMS/CQMM/CCQS/CQMS personnel are entitled to free admission to BCA's quality seminars and 20% discount on courses related to quality held at BCA Academy. More importantly, the certification is recognition of their training and achievement in delivering high quality projects and this adds to their market value in the industry.

CONQUAS 8<sup>th</sup> Edition now award bonus point to projects that employ CQMS/CQMM/CCQS/CQMS personnel subject to requirements as specified. Please refer to the CONQUAS manual for details.

## APPLICATION

For more details, please contact Mr Wong Chee Hong at 6730 4492 or email to [wong\\_chee\\_hong@bca.gov.sg](mailto:wong_chee_hong@bca.gov.sg). 



# MAKING A DIFFERENCE

## CSR COLLABORATION WITH SCAL AND INDUSTRY FIRMS

BCA is committed to contributing to the well-being of the community and the environment. The BCA's CSR framework, thus, adopts a two-pronged approach:

- (a) Formulating and implementing policies and initiatives to champion an environmentally sustainable and user-friendly built environment in Singapore; and
- (b) Organising community and environmental activities that involve our officers and families, students of BCA Academy, and built environment companies in active volunteering and charity work.

BCA regularly collaborates with the built environment sector in its CSR activities. Our most recent CSR activity was a collaboration between BCA, the Singapore Contractors Association Limited (SCAL), and other industry firms to carry out repair and improvement works at the Singapore Association for the Visually Handicapped (SAVH) on 22 and 23 May 2013.

This was made possible by the strong support from our generous materials sponsors and SCAL member firms:

- 1) Boral Plasterboards – **Drywalls and Ceiling Boards**
- 2) Conrac-Image – **Carpet Tiles and Manpower**
- 3) Megaman Lighting – **Energy-efficient LED lights**
- 4) Pest off – **Termite Treatment**
- 5) Woh Hup (Private) Limited – **Manpower**
- 6) Hexacon Construction – **Door Frames and Manpower**
- 7) Jingle Interior Decorations – **Manpower**
- 8) Halcyon Design – **Manpower**

A BIG 'Thank You' to SCAL and the industry firms who made a difference by creating a more conducive living environment for the visually handicapped.



Top | BCA staff and SAVH members on an outing to Kent Ridge Canopy Walk and Reflections at Bukit Chandu on 22 May 2013.

Bottom | From front to back: Mr Tan Guan Heng (First Vice-President, SAVH), Dr Ho Nyok Yong (President, SCAL), and Mr Lam Siew Wah (Deputy CEO, BCA) initiating the ground-breaking at SAVH on 22 May 2013.



On 22 March 2013, BCA and the built environment industry raised a total of \$37,000 for SAVH at our 2013 Dinner & Dance. This is on top of the \$578,000 raised for the 2012 President's Challenge held in conjunction with the BCA Awards Night. This was BCA's largest charity drive involving the industry. **P**



Top | BCA staff, SCAL and its members, and material sponsors at SAVH on 22 May 2013.

Middle | BCA and the built environment industry raised \$578,000 for the 2012 President's Challenge.

Bottom | BCA and the built environment industry raised \$37,000 for SAVH at our 2013 Dinner & Dance.

# 2<sup>ND</sup> URBAN SUSTAINABILITY R&D CONGRESS

THE 2<sup>ND</sup> URBAN SUSTAINABILITY R&D CONGRESS WAS HELD ON 27 AND 28 JUNE 2013 AT THE BIOPOLIS

The Congress is a national platform for government agencies, research institutes and private sector companies to come together to discuss R&D responses to national urban sustainability challenges. The two-day event attracted more than 700 international and local participants, with a good mix of participants from the research community (44%), public sector (32%) and private sector (24%). The Guest-of-Honour, Mr Lee Yi Shyan, Senior Minister of State, Ministry of National Development and Ministry of Trade and Industry, made some key announcements on the government's commitment on various research grants including \$5 million new Innovation Grant (iGrant) for Green Buildings and up to \$20 million R&D funding for Building Energy Efficiency via the Energy Innovation Research Programme (EIRP)<sup>1</sup>, to be administered by BCA.

## MINISTER FOR NATIONAL DEVELOPMENT R&D AWARD 2013

SMS Lee also presented the Minister for National Development R&D Awards<sup>2</sup> to outstanding projects which have contributed towards MND's vision of creating an "Endearing Home and a Global City". For the first time this year, MND extended the award to external partner agencies who have also contributed towards its vision.

BCA's project with Samwoh Corporation Pte Ltd, "From waste to high value construction material – the first building in the region using 100% Recycled Concrete Aggregate" was awarded the Merit Award for promoting the use of recycled waste materials, and setting an international benchmark for sustainable construction.

## GREEN BUILDING TRACKS

In this year's R&D Congress, BCA was in charge of two Green Building tracks. The Green Building track on Day 1 provided an overview of the R&D landscape and challenges faced for green buildings in Singapore where speakers from the private sector and academia shared their perspectives on Singapore's R&D directions and developments in research capabilities.

The track on "Innovations in Green Building – From Laboratory to Market" provided an overview of the latest available green building technologies and innovation opportunities. Speakers also shared their insights on



Top | Opening address by SMS Lee.

Above | Dr Ho Nyok Yong from Samwoh Corporation Pte Ltd receiving MND R&D Award from SMS Lee.

Left | Er Ng Eng Kiong, President of Singapore Green Building Council, giving a keynote presentation at the Green Building track.

test-bedding of innovative technologies. In all, the Green Building tracks were attended by a total of around 240 participants for both days.

The Urban Sustainability R&D Congress also served as a platform for participants to discuss opportunity for commercialisation of R&D projects and facilitate collaborations between research community and industry.

See more at: <http://www.mnd.gov.sg/urbansustainability/index.html> 

<sup>1</sup> Energy Innovation Research Programme ("EIRP", formerly Clean Energy Research Programme) is a competitive grant call funded by the National Research Foundation. Co-led by the Economic Development Board (EDB) and Energy Market Authority (EMA) under the Energy Innovation Programme Office (EIPO).

<sup>2</sup> This Award was established in 2011 to recognise outstanding R&D efforts within the MND Family.



# BE GREEN OR BE SQUARE!

## THE SPREAD OF THE GREEN MESSAGE HAS CONTINUED INTO THE SUBURBS

This time, BCA's adorable Greco and Beco paid a visit to United Square at Novena on 28 to 30 June, as part of BCA's Green Building Exhibition campaign. The mascots clued shoppers in on the importance of greener homes and offices as well as the viability of green careers.

This is the third exhibition in this series, following the exhibitions at Lot 1 Shopper's Mall and Ion Orchard, which attracted more than 15,000 visitors.

Dr John Keung, CEO of BCA, also took the exhibition as an opportunity to announce the launch of the "Tour of Green Mark Offices", a pilot outreach programme intended to promote sustainability practices in the office through the showcase of Green Mark office interior features.

*"Through this programme, we hope to create greater awareness of the benefits of working in certified Green Mark offices, and cultivate a culture of sustainability among office staff. Targeting senior and mid-management executives and CSR personnel who have a decision-making role in adopting Green Mark for Office Interiors, the launch of this first-of-its-kind tour in Singapore is timely due to the growing appeal of green offices worldwide."*

DR JOHN KEUNG, CEO OF BCA

The first tour will be held at Jurong Consultants' office at the JTC Summit on 22 July 2013.

A Green Mark Platinum award winner under the "Office Interior" category, the tour will showcase a barrier-free open office design with utilisation of natural lighting in the workstation layout arrangement and an extensive use of environmentally friendly materials in renovation and office operations. **P**



Top | Greco and Beco, a hit with the kids.

Left | Dr John Keung declaring the exhibition open with Minister Lui Tuck Yew.

# EXISTING BUILDINGS TO GO GREEN!

IN A LANDMARK MOVE THAT WILL MAKE SINGAPORE THE FIRST IN THE WORLD TO MANDATE MINIMUM ENVIRONMENTAL SUSTAINABILITY STANDARDS FOR EXISTING BUILDINGS, THE SECOND HALF OF 2013 WILL SEE BUILDING OWNERS HAVING TO FULFIL THREE REQUIREMENTS UNDER THE BUILDING CONTROL ACT

Phase one of the new legislative requirement of achieving a minimum GM standard for existing buildings will focus on hotels, and retail and office buildings with a minimum gross floor area of 15,000m<sup>2</sup> when they install or replace a chiller system. The building owner will be required to review the state of environmental sustainability of the building holistically, including overall building energy efficiency, water efficiency, and indoor air quality, to meet the minimum GM standard. If necessary, the owner will also need to make other improvements such as improving the overall cooling system, lighting, and lift equipment.

“Our greatest challenge is to green existing buildings. Typically, a building cooling system consumes about 30–50% of the building total energy consumption, and the typical lifespan of the building cooling system can be as long as 15–20 years. Since building owners have to change their chiller systems when they run out of useful life, owners should ensure that the replaced systems are more energy efficient to last another 15 years or more. The payback period for such retrofitting work can be as short as three to seven years, depending on the extent of the retrofitting work. After the payback, the rest is a net gain for the owner,” said Dr John Keung, CEO of BCA.

To ensure that building owners regularly maintain the new energy efficiency cooling systems they have installed, owners are required to conduct energy audits every three years on building cooling systems.

Building owners either have to engage Mechanical Professional Engineers or energy auditors registered with BCA to carry out the audit within the specified timeframe.

This audit requirement is applicable to two groups of buildings. The first group is existing buildings that have installed or replaced their building cooling systems to meet the minimum GM-Certified level.

The second group is new buildings and retrofitted buildings (except industrial and residential ones) that are installed with the chilled-water cooling system and have met the GM-Certified level under the Building Control (Environmental Sustainability) Regulations imposed from December 2010.

The third regulatory measure requires that building information and energy consumption data be submitted annually. This will be done in stages starting with hotels, and retail and office buildings.

Utilities suppliers such as SP Services are required to provide the annual electricity consumption data of individual buildings while building owners are required to provide other building data such as GFA, tenancy composition, and building system details.

This information can be submitted via an online portal, and will be a one-off exercise for building owners upon receiving notices from BCA. Subsequently, they need only update the information online when there are changes.

The data collected will form the basis of the national energy benchmark for the building sector. BCA will also analyse the data collected, and share electricity consumption in comparison to other buildings of similar types with building owners, so that they will be able to pro-actively monitor and improve their building's energy efficiency. P

## REQUIREMENTS CHEAT SHEET

- Achieve a minimum Green Mark (GM) standard for existing buildings when a cooling system is installed or retrofitted
- Carry out a tri-yearly energy audit on building cooling systems
- Submit building information and energy consumption data annually



# TIGHTER BUILDABILITY AND CONSTRUCTABILITY REQUIREMENTS TO BOOST PRODUCTIVITY

BCA IS SET TO RAISE THE MINIMUM BUILDABILITY AND CONSTRUCTABILITY SCORE REQUIREMENTS FOR ALL NEW PROJECTS BY THREE POINTS EACH AFTER JULY 2013, AND BY ANOTHER TWO POINTS EACH IN JULY 2014

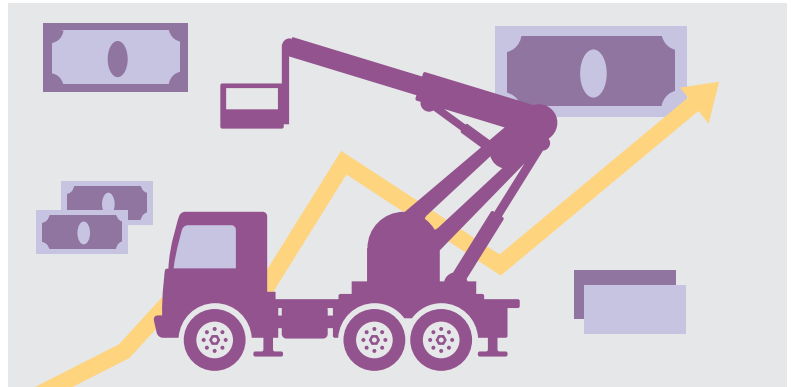
This is aimed at improving productivity across the entire construction value chain, from planning and design to construction. Based on past projects, a five-point increase in the buildability score will yield manpower savings of approximately 10–15%.

With higher buildability requirements, architects and engineers upstream in the construction value chain will have to consider the productivity requirements early on and ensure that building designs are easier and more efficient to construct. This means that building designs will have to include more productive technologies and wider adoption of standard components to allow for ease of construction.

For example, designs with the use of brick walls and plastering finishes, which are more labour intensive, will be strongly discouraged under the buildability requirements.

To push consultants and contractors to adopt more buildable designs and advanced construction technologies, BCA will introduce tendering advantages for both consultants and contractors with good buildability and constructability records respectively in their tenders for public sector projects with effect from 15 July 2013.

Bonus incentives for both consultants and contractors are also being explored, to further encourage them to go beyond the minimum legislated buildability and constructability scores.



## ENHANCEMENT OF THE CONSTRUCTION PRODUCTIVITY AND CAPABILITY FUND (CPCF)

To further support productivity efforts and extend more help to contractors and consultants, BCA is enhancing its incentive schemes under the Construction Productivity and Capability Fund (CPCF). To date, about \$85 million of the CPCF has been committed, benefitting more than 2,300 individual firms, more than 80% of which are small firms.

The funding level of the Mechanisation Credit (MechC) and Productivity Improvement Project (PIP) schemes will be raised from 50–70% for firms that achieve an at least 30% improvement in productivity.

With this enhancement, contractors can now receive more funding support when purchasing or leasing equipment like the auto-wheel washer or boom lift when they tap on the MechC scheme to improve productivity. Companies may also receive additional reimbursements for their investments when tapping on the PIP scheme to improve their site processes by adopting advanced construction technology.

Furthermore, funding caps for firm and industry-level applications under the PIP scheme will be raised to encourage more firms to introduce new technologies. For firm-level applications, the funding cap will be increased from \$100,000 to \$300,000 for the adoption of key productive technologies. Such technologies include prefabricated bathrooms, self-compacting concrete, and precast and steel construction. BCA will also raise the funding cap for industry-level applications to \$5 million per application for game-changing projects that achieve an at least 40% productivity improvement.

A MechC Referral Programme has also been introduced to encourage contractors to help their smaller sub-contractors overcome inertia in improving productivity. Contractors can earn an additional \$20,000 credit to increase their funding cap as an incentive for every successful referral to the MechC scheme. **P**

*“These measures will help companies in the built environment sector make the transition, so that the sector as a whole will be transformed into one which is highly integrated and technologically advanced, and supported by a skilled and competent workforce.”*

DR JOHN KEUNG, CEO OF BCA



# AN EVENING TO REMEMBER – THE BCA AWARDS 2013

## A GATHERING OF THE INDUSTRY'S FINEST

It was a night of congratulatory messages and merrymaking as professionals from the built environment sector came together to celebrate outstanding projects and recognise their peers' excellence at the annual BCA Awards on 16 May 2013.

Held at Resorts World Sentosa, the event saw the attendance of some 2,700 guests and VIPs including Senior Minister of State for Trade and Industry and National Development Lee Yi Shyan.

This year, two new award categories under the Construction Productivity Award were created, while a new Universal Design Mark Award replaced the previous Universal Design Award.





▶ THE BCA AWARDS AT A GLANCE!

The “Oscars” of the built environment sector, the BCA Awards seek to honour and pay tribute to excellence in safety, quality, sustainability, and user-friendliness. This year’s ceremony saw the industry receive a total of 293 awards in ten broad categories.

- 1 Green Mark Champion Award
- 177 Green Mark Awards
- 8 Green Building Individual Awards
- 26 Universal Design Mark Awards
- 31 Construction Excellence Awards
- 6 Quality Excellence Awards
- 7 Design and Engineering Safety Excellence Awards
- 22 Green and Gracious Builder Awards
- 14 Construction Productivity Awards
- 1 Built Environment Leadership Award



Top | Echelon and CDL won the Platinum Awards for the BCA Green Mark Award (New Buildings) and the BCA Construction Productivity Award – Advocates (Developers) respectively.

Above | Mr Russel Neil Cole receiving his Green Building Individual Award.

Right | Allgreen Properties receiving the BCA Quality Excellence Award for Quality Champion (Gold).



**GREEN MARK CHAMPION 2013**

Launched in 2008, the BCA Green Mark Champion Award recognises developers with a strong commitment to corporate social responsibility and environmental sustainability. It is given to developers who achieve a substantial number of Green Mark buildings at Gold level and above.

Having clinched ten projects with a Green Mark Gold and above, including six Platinum, three Gold<sup>Plus</sup>, and one Gold, JTC Corporation (JTC) became the only organisation to receive the Green Mark Champion award this year.

The requirements to qualify as BCA's Green Mark Champion are rigorous. The developer or building owner is expected to deliver at least three Green Mark Platinum, three Gold<sup>Plus</sup> and four Gold projects. One of JTC's Platinum awards was awarded to CleanTech Park for its distinctive green district design.



Top | Biopolis  
 Above | CleanTech One  
 Bottom | Fusionpolis

**A CHAMPION IS ALSO SOCIALLY RESPONSIBLE**

The Green Mark Champion Award is presented to leading developers and building owners who have demonstrated exceptional Corporate Social Responsibility by driving and actively promoting Singapore's green building movement.

The Green Mark Champion Award has two levels, Champion and Platinum Champion. To attain the Green Mark Platinum Champion Award, the winner must have at least 15 Green Mark Platinum, 15 Gold<sup>Plus</sup>, and 20 Gold projects. The Green Mark Platinum Champion Award was not given out this year.

“JTC is honoured to receive the BCA Green Mark Champion Award for 2013, which is a testament to JTC's growing commitment to environmental sustainability. As Singapore's leading industrial infrastructure specialist, it is crucial for JTC to play an active leadership role in environmental sustainability and stewardship. Sustainability is a key consideration in our master plans and developments, and we are continuously stepping up our efforts to address environmental challenges in a pragmatic manner.”

MR PNG CHEONG BOON, CEO OF JTC



“In developing Singapore as a model green city, we need to move towards this paradigm of green buildings, districts, parks, and other infrastructure and facilities to enable us to achieve social, economic, and environmental sustainability. BCA encourages more owners, developers, and master planners to set their sights on attaining the BCA Green Mark Champion and Platinum Champion status to firmly establish themselves as champions for the sustainability of our environment.”

DR JOHN KEUNG, CEO OF BCA



Above | The AXA building achieves energy savings of 2,047,985 kWh/year through its centralised chilled water air-conditioning system and a Building Automation System (BAS) to monitor its air-conditioning and Mechanical Ventilation System as well as other systems.

Left | Leedon Park features energy efficient air-conditioning and lighting systems.



### ACHIEVING CONSTRUCTION EXCELLENCE

This year's BCA Award saw the giving out of 31 awards for construction excellence. Comprising of 18 awards and 13 certificates of merit, this is the highest number in the 27-year history of the award.

The record number of Construction Excellence Awards is in line with the significant improvement in quality and workmanship standards over the years. In particular, the average CONQUAS score of HDB flats today is 86.3 compared to 76.8 ten years ago. Also, since the BCA Quality Mark was introduced in 2002, more than 60,000 private residential units have been committed or assessed under the scheme.

While quality is still a key judging criterion for the Construction Excellence Award, more builders are also emphasising productivity and excellent site management in their projects.

To improve both quality and productivity, Shimizu Corporation combined vertical and horizontal precast façade elements into one component for easier installation during the construction of NUS Graduate Residence at University Town. This also improved quality as it eliminated the risk of potential water seepage into the joints if the elements were cast on site.

*“As Singapore's property pioneer, CDL has long been committed to building quality. For over a decade, we have harnessed state-of-the-art technology and introduced innovative construction methodology for quality excellence in our developments. For continual improvement, we work closely with our builders to achieve stringent building quality targets for each development, and have also implemented a benchmarking scheme for our projects against industry standards.”*

MR KWEEK LENG JOO, MANAGING DIRECTOR, CITY DEVELOPMENTS LIMITED

Dragages Singapore Pte Ltd and local builder Tiong Seng Contractors Pte Ltd also adopted drywall and prefabricated components for their projects. The result is the achievement of high quality and productivity in these projects. Both builders clinched the Construction Excellence Award for The Residences at W Singapore – Sentosa Cove and Shelford Suites respectively.

Other highlights include China Construction (South Pacific) Development Co. Pte Ltd's achievement as winner of four awards for the mixed development at Clementi Town, International School Campus at Tampines, Duchess Residences and building works at Punggol West Contract 18.

“We are glad to note that more and more developers, consultants and builders are embracing both high quality and productivity in their projects. As our award winners have shown, high quality can go hand-in-hand with productivity through the adoption of buildable designs and better material choices,” said Mr Tan Tian Chong, BCA's Group Director, Technology Development and one of the assessors of the Construction Excellence Award.

Top | The International School Campus uses precast hollow core wall with skim coat for partition improved productivity and achieved better finishes.

### QUALITY IS THE NAME OF THE GAME

This year, three developers and three builders received the inaugural Quality Excellence Award. Winners, City Developments Limited (CDL), Woh Hup (Pte) Ltd, and Dragages Singapore Pte Ltd were given the top Quality Champion (Platinum) accolade.

The Quality Excellence Award recognises leading progressive developers and builders which have embraced quality workmanship through the BCA Construction Quality Assessment System (CONQUAS) and Quality Mark (QM) Scheme, and delivered high quality projects consistently.

With over 5,300 private residential units committed under QM and an average CONQUAS score of 93.3 for its projects in the past five years, CDL was the only developer conferred the Quality Champion (Platinum) title



among the three winning developers. Among builders, Dragages and Woh Hup also clinched the platinum award for committing more residential units under QM, and for consistently achieving high QM and CONQUAS scores.

As part of its key quality initiatives, CDL has been adopting buildable design and productive construction methods at its residential developments. These include using Prefabricated Bathroom Units (PBU) and drywall to achieve better quality standards and product consistency. While PBU improve water tightness and overall workmanship quality of bathrooms by enabling rigorous checks and testing under a controlled factory environment prior to its installation, drywalls have a superior quality finish and acoustic performance compared to traditional brick walls.

Similarly, local builder Woh Hup ensures high quality standards through the use of system formwork and precast structural works, PBU and drywall partitions for architectural works. Not only do these construction methods require less manpower, they also result in better quality control, fewer mistakes, and less downtime needed for rectification works.

Although CONQUAS and QM are voluntary schemes, their take-up rates have also risen over the years. More than 3,250 new construction projects have been assessed to date using CONQUAS, with 95% of private residential and commercial buildings in Singapore subscribing to it in 2012. There is also good buy-in for QM, first launched in 2002, with over 260 projects or 60,000 private residential units currently committed to or assessed under QM.

The QM scheme is fuelled by higher public expectations for building quality and a stronger focus on delivering quality in the industry. It provides enhanced assurance of workmanship quality to homebuyers and boost the marketability of such projects. For instance, private residential projects committed or certified under QM generally experience 40% less defects per unit compared to non-QM projects.

"I am very pleased and honoured to receive this award as it is testimony to our commitment to deliver quality homes. We have dedicated much time, effort, and resources to deliver high quality, well-finished homes to clients and eventual homeowners. We employ a rigorous quality management system, aiming to eliminate defects to ensure each home owner of a Woh Hup building project is a satisfied customer. We will continue to work hard and strive to consistently deliver not only on quality, but also on all other commitments made in the hope of creating the Woh Hup brand, one of a world class, premium contractor."

MR NEIL YONG, DIRECTOR OF WO HUP (PTE) LTD



Above | The Livia Condominium introduced separate refuse disposal for organic waste and recyclable waste.

Right | Precast concrete components were widely used in the construction of the Ritz-Carlton Residences for areas like staircases, refuse chute liners and household shelter door frames to improve productivity and quality.



"From the business perspective, pursuing high quality can be a key differentiator when meeting heightened customer expectations and improving corporate reputation. However, it is important for firms in the built environment sector to drive quality in the most efficient and effective manner through upstream planning and greater integration in the value chain. As Quality Excellence Award winners have shown, quality excellence and productivity can go hand-in-hand as productive technologies offer not only speedier construction with fewer workers, but also quality finishes with better control and precision."

DR JOHN KEUNG, CEO OF BCA

### HIGHLIGHTING SAFETY DESPITE DESIGN COMPLEXITY

Despite its complex design, the ArtScience Museum maintained its safety excellence, and is one of seven projects this year to win the Design and Engineering Safety Excellence Award.

Introduced in 2008, the award recognises engineers for their exemplary design feats and high safety standards in the structural design, construction, and maintenance of buildings.

Resembling a lotus flower, the ArtScience Museum is a unique three-dimensional structure with two levels and ten petals of varying heights and widths spaced evenly on a radial axis.

One main challenge was the non-symmetrical shape of the building as one side of the lotus flower is bigger than the other, and the structure is naturally heavier on one side.

To address this, Arup's global team of engineers, which includes Er Brendon McNiven and Er Chia Wah Kam, had to design a rational and simple way of supporting and balancing the structure.

Some of the solutions introduced included a structural ring at the base of the flower and diagonal grids to stabilise the slender columns.

In addition, the extensive use of BIM helped to resolve complex coordination and documentation issues. Large temporary structures were also designed to support the main structure and provide a working platform during the installation of steel structures to ensure safety.

Also, extensive vibration analysis was conducted on the gallery floor slabs to ensure that they do not experience excessive vibration due to foot movement.



*“As projects become more complex, engineers of winning projects have demonstrated that they have put in extra effort to come up with creative solutions to overcome design challenges, without compromising safety.”*

MR PEK LIAN GUAN, CHAIRMAN OF THE ASSESSMENT COMMITTEE AND BCA BOARD MEMBER

### BRIDGING STUDENTS, MINIMISING ENVIRONMENTAL IMPACT

The National University of Singapore Link Bridge, which connects the Kent Ridge campus to University Town, spans ten busy traffic lanes of the Ayer Rajah Expressway (AYE). The 274-metre bridge was designed with an S-shaped alignment to minimise impact on existing buildings and services.

Despite site constraints, there was minimal impact on traffic and public safety as the main 100-metre span of bridge over the AYE was constructed using precast segmental cantilever launching technology, and bridge segments were cast off-site and transported for assembly on-site during off-peak hours.

This enhanced safety and eliminated the need for temporary structures and road closures during the day.

Also, precise bridge analyses with multi-stage pre-stressing were carried out to study the bridge behaviour at all stages of construction including the permanent stage, to ensure structural adequacy and construction safety as well as an accurate construction of the bridge despite its curvature.


Top | The ArtScience Museum has an extremely unique and challenging three dimensional structural form.

Left | The NUS Link Bridge joins the Kent Ridge Campus and University Town. It spans across 10 busy traffic lanes of the Ayer Rajah Expressway.

### PROVIDING LEADERSHIP FOR THE BUILT ENVIRONMENT

The Land Transport Authority took home this year's Built Environment Leadership Award (Gold). This is in recognition of the Agency demonstrating excellence and leadership in shaping a safe, high quality, sustainable, and friendly built environment in Singapore.

The chief aim of the Award is to serve as a comprehensive benchmark for the building and construction industry, encouraging other organisations to improve and spurring them towards a higher degree of professionalism with enhanced capabilities, competitiveness, and productivity.

To-date, a total of three Platinum and 15 Gold awards have been given out since the inception of the Award in 2009. 



# HIS TIME IN THE SUN

WHEN THE GOING GETS TOUGH, THE TOUGH GETS GOING



Below | Sun He (in red) and fellow first year students at the Freshmen Orientation 2009.

This adage certainly applies to Sun He—a top student from BCA Academy and winner of a Gold Award upon graduation. He continued to do well in his further studies and was awarded First Class Honours in his Bachelor of Civil Engineering degree at Nanyang Technological University (NTU).

All this would not have been possible without sheer determination on his part and dedicated support from his lecturers.

Knowing that Sun was struggling with his command of English, Mr Rahman, Sun's lecturer at BCA Academy, made an effort to build a rapport with him and delivered lectures at a slower pace, both of which helped allay Sun He's fear of learning.

Being one of the top students at the Diploma level, Sun took the Diploma Plus in Physics, which provided him with a strong foundation for his studies at NTU. Diploma Plus is only offered to students who display excellence in academic achievement.

Despite his heavy study load at the Academy, Sun displayed strong leadership skills, and was appointed as the first President of the Student Council.

"My dream is to design buildings that will leave behind a legacy. The education and training I received at BCA Academy has given me a strong foundation and support in making my dream into a reality," mused Sun.

One thing led to another, and in his third year, Sun was presented with the opportunity to embark on a high-profile R&D project with New Earth Pte Ltd as a researcher. This opportunity allowed him to apply the knowledge and technical skills he had learned in his diploma studies.

During his final year of study at NTU, Sun was selected to pursue Master's programme modules at the National



University of Singapore under the Singapore Universities Student Exchange Programme (SUSEP). On top of this, he emerged as one of NTU's First Class Honours' students, with an impressive GPA of 4.56. He was also offered a position as a Site Engineer at Tiong Seng Holdings Limited before he graduated.

Sun now has his sights set on becoming a senior project or site engineer within the next three years, and a Professional Engineer within five years.

"I want to thank BCA Academy for everything it has done for me. It has not only taught me technical knowledge and practical skills, but also nurtured my leadership and interpersonal skills. The school has given me the golden opportunity to be the first BCA Academy Student Council President, and supported me unconditionally in establishing an entire Student Council from scratch. I am extremely grateful to my Academy lecturers, Mr Rahman and Mr Ye Din Moe, who continued to mentor me even when I encountered problems with studies at NTU," said Sun, with a smile. **P**

# IMPROVING CONSTRUCTION PRODUCTIVITY WITH PRECAST HOLLOW CORE HOUSEHOLD SHELTERS

ALL NEW RESIDENTIAL BUILDINGS AND HOUSES ARE REQUIRED TO CONTAIN HOUSEHOLD AND/OR STOREY SHELTERS UNDER THE CIVIL DEFENCE SHELTER ACT 1997

As the technical authority in this domain, BCA initiated technical requirements for precast hollow core household shelters (precast HS). BCA and SCDF jointly circulated these requirements to the construction industry on 25 January 2013.

## HIGHER CONSTRUCTION QUALITY AND PRODUCTIVITY

In the development of technical requirements, standardisation, modular design, weight of the precast HS, hollow core sizes and layouts, steel bar detail, and vertical and horizontal connections were considered. These are critical to guide the industry in achieving an efficient precast design so as to raise production and construction productivity for residential projects.

In addition, better quality hollow-core precast HS can be produced under factory controlled production processes (See Figure 1) compared to the ones produced during in-situ construction. Additionally, precast HS can be delivered to worksites on time and installed directly from trailers with proper planning and coordination between the construction project team and the precaster. This would save time and resources from double handling of precast HS for storage onsite prior to installation (See Figures 2 and 3).

## CONSULTATION SERVICES


For smooth implementation, BCA provides technical consultation services to developers and professionals on design and detailing of hollow core precast HS. For example, HDB in consultation with BCA has produced standard precast HS designs for use in public housing projects (See Figure 4). 



FIGURE 1



FIGURE 2



FIGURE 3



FIGURE 4

## DESIGN HIGHLIGHTS:

- Seven basic forms of precast HS designs including single household shelter and two adjoining household shelters with varied layouts of hollow cores, doors, ventilation sleeves, and electrical services
- Modular size of Precast HS with an increment of 50mm
- Standardised hollow core spacing and sizes, with a core length ranging from 200–500mm, and an increment of 100mm
- Hollow cores tapered 15mm from the bottom to the top to facilitate de-moulding of precast HS
- Welded steel mesh for precast HS wall and slab
- Four standardised details of steel cage reinforcement bars in hollow cores
- Standardised precast HS slab details

Top | Precast household shelters.

Above (Left) | Precast household shelters delivered to construction site.

Above (Right) | Precast installed.

Bottom | Precast household shelters discussion between BCA and HDB.

# GOOD THINGS COME IN PAIRS

THE LAST COUPLE OF MONTHS SAW BCA BEING ACCORDED TWO AWARDS FOR EXCELLENCE IN AREAS INVOLVING CSR AND E-SERVICES

## CORENET EARNS BCA TOP HONOURS

18 government services received awards today at the inaugural e-Government Excellence Awards ceremony (GEA) for excelling in e-Government services. Jointly organised by the Ministry of Finance and Infocomm Development Authority of Singapore, the event is a whole-of-government effort to recognise agencies for excellence in e-Government and encourage improvements across all public sector agencies.

Held at the Mapletree Business City, the event was graced by Guest-of-Honour, Mr Peter Ong, Head Civil Service, who gave out six distinguished winner awards and 12 merit awards in six award categories: Websites, e-Services, m-Services, Data Sharing, People Engagement and Shared System and Services.

The competition saw over 90 submissions from more than 45 government agencies. The judging criteria for entries included business impact and benefits, alignment to best practices and innovativeness. Winners were selected based on public satisfaction ratings as well as evaluation by a panel of judges comprising industry representatives from the private sector.

BCA won the Distinguished Award under the Shared Systems and Services category for the One-Stop CORENET System.

## A CSR AWARD FOR ALL!

On 1 March 2013, BCA clinched the Prestigious HRM award in Best CSR Practices. This is achieved amidst stiff competition from other nine established organisations including FedEx Express, Fuji Xerox Singapore, Resorts World Sentosa Singapore, Ritz Carlton Millenia Singapore, etc. This is certainly a testimony of our CSR efforts!

The HRM award in Best CSR Practices recognises organisation with the ability in aligning corporate social responsibility initiatives with staff participation and engagement for the benefit of the community and worthy charitable causes – whilst enhancing team spirit and improving retention.

This prestigious award would not have been possible without the strong support from all who have collaborated with us in our CSR activities. **P**



## EVENT LINE UP

Build Smart Conference 2013  
– Productive Technologies  
and Processes  
– Integrate – Transform  
with BIM   
**31 JUL & 1 AUG 2013**

Good Industry Practices  
(Painting)  
**13 AUG 2013**

Pile Foundations Design and  
Construction for Engineers  
(22<sup>nd</sup> Run)  
**13, 15, 20 & 22 AUG**

GMP-CORE – Solar Modeling  
(15<sup>th</sup> Run)  
**15, 16 & 19 AUG 2013**

Green Mark Professional  
Programme 2013  
**15 AUG 2013–18 MAR 2014**

Management of Water and  
Environmental Services for  
Estate Managers (2<sup>nd</sup> Run)  
**19–21 AUG 2013**

Certification Course for Site  
Investigation Supervisors  
(8<sup>th</sup> Run)  
**19, 20, 26 &  
27 AUG 2013**

Workshop on Site  
Management of Precast  
Concrete Construction  
(11<sup>th</sup> Run)  
**19, 22 & 26 AUG**

Good Industry Practices  
(Aluminium Window)  
**20 AUG 2013**

Workshop on Programme Risk  
Management – Technical Use  
of Programmes to Control,  
Manage and Optimise the  
Project (5<sup>th</sup> Run)  
**22 AUG 2013**

GMP-CORE – Building  
Energy Modeling & Thermal  
Simulation (14<sup>th</sup> Run)  
**22, 23, 28 & 29 AUG**

Workshop for Company  
CEO/Top Management  
(bizSAFE Level 1) (22<sup>nd</sup> Run)  
**22, 23, 28 & 29 AUG**  
(AFTERNOON)

Requirements for  
Environmental Sustainability  
in Buildings and The Green  
Mark Scheme (25<sup>th</sup> Run)  
**30 AUG 2013**

Understanding the Green  
Mark Criteria for Existing  
Building and Office Interior  
(21<sup>st</sup> Run)  
**4 SEP 2013**

Workshop on Indoor &  
Outdoor lighting with Light  
Emitting Diode (8<sup>th</sup> Run)  
**4 & 5 SEP**

Workshop on Protection  
against Lightning for Buildings  
(4<sup>th</sup> Run)  
**10 & 11 SEP**

Develop A Risk Management  
Implementation Plan (bizSAFE  
Level 2) (73<sup>rd</sup> Run)  
**12 & 13 SEP**

Certification Course for  
Universal Design Assessors  
(5<sup>th</sup> Run)  
**16, 17, 23 & 24 SEP**  
(ASSESSMENT ON 8 OCT)

GMP-CORE – Efficient  
Building Envelope Design,  
ETTV & RETV (12<sup>th</sup> Run)  
**17 & 18 SEP 2013**

Site Investigation for  
Engineers (16<sup>th</sup> Run)  
**17, 19, 24 & 26 SEP**

2-Day BIM Planning Course  
(Building Developers and  
Facility Managers) (6<sup>th</sup> Run)  
**18 & 19 SEP**

Workshop on Geotechnical  
Design using Eurocode 7  
(6<sup>th</sup> Run)  
**24, 26 SEP, 1, 3, 7 & 8 OCT**

Workshop on Seismic Design  
of Building Eurocode 8  
(2<sup>nd</sup> Run)  
**25 SEP 2013**

BMSMA for Building  
Management Personnel  
(7<sup>th</sup> Run)  
**26 & 27 SEP**

Workshop on Managing  
Project Teams Effectively  
(5<sup>th</sup> Run)  
**30 SEP & 1 OCT**

GMP-ELECTIVE – Sustainable  
Hot Water & Heat Recovery  
Systems (3<sup>rd</sup> Run)  
**30 SEP 2013**

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- similar to the Australian Diploma Programmes



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"O" LEVEL HOLDERS  
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