

The Next Level

BCA Annual Report 2010/11

BUILDING FOR TOMORROW, *TODAY*

RAISING PRODUCTIVITY

– *BUILDING WORKFORCE CAPABILITIES AND STRENGTHS*

ENTER THE DIGITAL AGE

– *BUILDING SMART WITH BIM*

SENSE AND SUSTAINABILITY

– *A BLUEPRINT TO A GREEN, SUSTAINABLE FUTURE*



PRODUCTIVITY



USER-FRIENDLINESS



SAFETY



QUALITY



SUSTAINABILITY



MISSION AND VISION

OUR MISSION IS TO SHAPE A SAFE, HIGH QUALITY, SUSTAINABLE AND FRIENDLY BUILT ENVIRONMENT.

Safety, Quality, Sustainability and User-friendliness are four key attributes of our built environment where BCA has a significant influence on. They distinguish Singapore's built environment from those of other cities. Hence, our vision is to have the best built environment for Singapore, our distinctive global city.

STRATEGIC THRUSTS

We aim to be a caring and progressive organisation that values its people, the innovative spirit, integrity, and service excellence.

We ensure high safety standards and promote quality excellence in the built environment.

We champion barrier-free accessibility and sustainability of the built environment.

We lead and transform the building and construction industry by:

- | Enhancing skills and professionalism |
- | Improving design and construction capabilities |
- | Developing niche expertise |
- | Promoting export of construction-related services |

We forge effective partnerships with the stakeholders and the community to achieve our vision.

CORE VALUES

WE CARE | We care for the well-being of our staff, the community and the environment. We serve our customers with respect and integrity.

WE DARE TO DREAM | We dare to be innovative and seek opportunities to transform BCA and the industry.

WE CAN DO | We are a resilient organisation with the confidence, courage and ability to overcome challenges.

SENIOR MANAGEMENT:

Dr John Keung
Chief Executive Officer

Mr Benedict Tan
Managing Director (BCA Academy)

Mr Lam Siew Wah
Deputy CEO, Industry Development

Mr Ong See Ho
Deputy CEO, Building Control
Commissioner of Building Control

Mr Choo Whatt Bin
Executive Director, Services

Mr Ang Kian Seng
Director, Research Division

Mr Cheng Tai Fatt
Director, Corporate Development Division
Deputy Managing Director, Corporate Services (BCA Academy)

Mr Chew Keat Chuan
Director, Building Engineering Division

Mr Chin Chi Leong
Director, Building Plan & Management Division
Commissioner of Buildings
Commissioner of Amusement Rides Safety

Mr Koh Lin Ji
Director, International Development Division

Mr Neo Choon Keong
Director, Manpower & Strategic Policy Division

Mr Ong Chan Leng
Director, Special Functions Division

Mr Tan Tian Chong
Director, Technology Development Division
Director, Construction Productivity Centre

Mr William Tan Yong Keh
Director, Business Development Division,
Director, Construction Productivity Centre

Mr Wong Wai Ching
Deputy Managing Director, Training & Professional Development (BCA Academy)

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THE NEXT LEVEL

THE BUILDING AND CONSTRUCTION INDUSTRY of the future will be far removed and very different from the ideals and methodologies of today. The mindset behind any development project has to change; its fundamentals must be steady, yet universal, and its objectives must be more than just functional, but address local sensibilities and global concerns.

The push for faster, bigger and more complex projects must be balanced with a conscience – environmental sustainability that addresses global concerns, an attitude that both supports and nurtures the industry workforce, and most important of all, a sense of responsibility among all to achieve the common goal for a better future.

This annual report outlines how the Building and Construction Authority has made the push to meet these objectives and ensure that everyone crosses the line. From its aggressive push to higher levels of productivity, a more stable, capable workforce to its adoption of new exciting technologies, it has taken the steps to propel the building and construction industry to new heights.

With glowing examples already dominating our skyline and our streets in Singapore and much more to come, BCA is clearly setting the standard for The Next Level, today.

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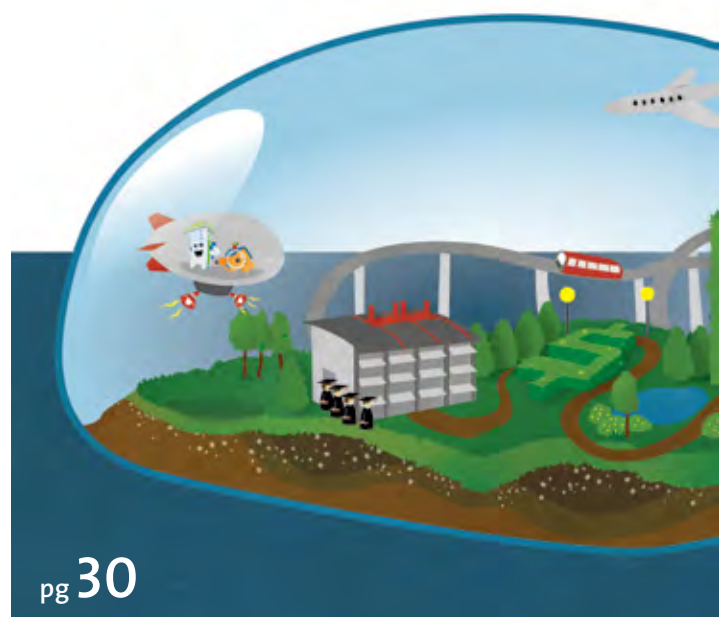
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CORPORATE GOVERNANCE

BCA IS COMMITTED TO GOOD CORPORATE GOVERNANCE. WE HAVE PUT IN PLACE A CODE OF CORPORATE GOVERNANCE TO FORMALISE THE PRINCIPLES AND PRACTICES OF GOVERNANCE WITHIN BCA TO ENSURE ACCOUNTABILITY, RESPONSIBILITY AND TRANSPARENCY.

BOARD MEMBERS

The Board currently comprises 13 members. All are non-executive members, except Dr John Keung who is BCA's Chief Executive Officer (CEO). The Board comprises representatives from the industry, academia and Ministries. The diverse representation of the Board provides an appropriate range of experience, skills, knowledge and perspectives to enable it to play an active role in guiding BCA to achieving its mission and vision.

The Chairman provides strategic leadership and guidance to the Management of BCA, and ensures that discussions are fairly, objectively and independently conducted.

The Board meets at least six times a year to evaluate, approve and monitor the plans and budgets of BCA. It also oversees the work and performance of the Management and assesses the financial health of BCA. The BCA Act empowers the Board to form committees from among its members to support the work of the Board.

FINANCE AND AUDIT

• **Internal Controls**

The Board ensures that the Management maintains a sound system of internal controls to safeguard the interests and assets of BCA. It also ensures that a review of BCA's material internal controls, including financial, operational and compliance controls, and risk management, is conducted annually through internal and/or external audits according to the direction of the Finance and Audit Committee.

• **Finance and Audit Committee**

The Finance and Audit Committee reviews the audited financial statements with the external auditors, and reviews audit plans and observations of the external and internal auditors. It also ensures that the Management takes appropriate action for audit observations and the Finance and Audit Committee's recommendations. All the members in the Finance and Audit Committee are non-executive members.

BCA'S CORPORATE SOCIAL RESPONSIBILITY STATEMENT

BCA IS DEDICATED TO CONTRIBUTING TO THE WELL-BEING OF THE COMMUNITY AND THE ENVIRONMENT THROUGH OUR EFFORTS IN SHAPING A SUSTAINABLE AND FRIENDLY BUILT ENVIRONMENT.

SERVING THE COMMUNITY

To us, serving the community is a privilege. Embedded in our core value, "We Care", we take pride in each and every contribution as we serve with our hearts for the good of the community and an inclusive society.

To achieve this, BCA will:

- shape a friendly built environment for Singapore through improving accessibility and promoting Universal Design;
- inculcate a spirit of volunteerism among staff;
- organise purposeful programmes that help to bring about a better built environment for all; and

- raise public awareness of the importance of a friendly built environment through dialogues, public education and collaborative projects.

GREENING THE BUILT ENVIRONMENT (BCA'S ENVIRONMENT POLICY)

BCA takes pride as the Green Leader for Singapore's built environment. Care for the environment is embedded strongly in our core values, and we are committed to championing this worthy cause together with our stakeholders to help promote environmentally sustainable developments.

To achieve this, BCA will:

- spearhead green strategies and initiatives towards sustainability in the built environment;
- champion and lead the building and construction industry in the development of sustainable building and construction;
- actively engage stakeholders through dialogues, public education and collaborative projects; and
- inculcate environmental awareness and commitment amongst our staff through educational and actionable programmes.

MOVING AHEAD IN 2011

FY2010 WAS ANOTHER EXCITING YEAR FOR BCA with numerous noteworthy achievements. BCA chalked up a scorecard of many firsts. Accolades received include the prestigious Energy and Environment Award by The Aspen Institute, the first to be awarded to a government agency outside North America. In the Asia Pacific region, Singapore was also ranked first in green building policy in a study conducted by a private consultancy firm, ahead of major cities like Tokyo and Seoul.

These are all strong testaments of our efforts and further reinforce BCA's crucial role in the construction industry, not only as regulator but also as a champion of green and socially responsible initiatives in the built environment.

PRODUCTIVITY – THE WAY TO GO

While Singapore takes another big step forward in the international front, a new buzzword, "Productivity", has taken centre stage within the local building scene. Nationwide, there is a concerted effort to move the whole of Singapore towards productivity-driven economic growth, and the construction sector cannot fall behind.

This drive towards productivity-based growth is also aligned to BCA's strategic focus, where the strategic thrust to lead and transform the construction industry to build productively will lead to the delivery of BCA's key outcomes of safety, high quality, sustainability and user-friendliness. This is further underpinned by our development of a caring and progressive organisation and

in forging effective partnerships with our stakeholders and the community to achieve our vision of a best built environment.

To help construction companies in the productivity drive, the Government has set aside a \$250 million Construction Productivity and Capability Fund for manpower development, technology adoption and in building new capabilities. A comprehensive construction productivity roadmap was also formulated by BCA and MND to develop strategies in driving manpower development, enhancing legislative framework, facilitating integration across the value chain, promoting technology adoption and raising industry awareness. **BCA is rigorously promoting these incentives to the industry to ensure that those who are actively taking initiatives to raise their productivity are given due assistance.**

To further engage the industry, BCA organised Singapore's first Construction Productivity Week in April 2011 to raise industry awareness of the importance of skills, training and technology adoption in construction, which are key factors in improving workers' productivity and transforming companies. The exciting week was a 3-in-1 event. There was a Building Information Modelling competition for designers and a skills competition for workers; a conference for industry stakeholders; and a trade exhibition, featuring the latest construction technology used worldwide.





BIM – THE NEXT WAVE

In line with the global trend, BCA is strongly promoting the adoption of Building Information Modelling (BIM), as a 'breakthrough' opportunity to improve construction productivity and the level of integration and collaboration across the various disciplines in the construction value chain. **BCA targets to get 80 per cent of the industry to use BIM widely by 2015 and we are working to get public agencies to take the lead to make BIM a requirement for public sector projects in 2012.** We are also looking to mandate BIM e-submission for regulatory approval within the next few years.

More than 120 international projects are certified or undergoing assessment under the various BCA Green Mark schemes.

SUSTAINABILITY – MAINTAINING THE ECO-BALANCE

On the sustainability front, the BCA Green Mark continues to gain traction internationally, with more than 120 international projects overseas certified or undergoing assessment under the various schemes. BCA has also been promoting our local building companies and capabilities overseas with an estimated \$2 billion worth of overseas projects clinched in 2010.

To further raise the profile of BCA as a regional green building hub, BCA organised another major

event, the Singapore Green Building Week (SGBW) in September 2011. The anchor event of the SGBW was the second biennial International Green Building Conference (IGBC) which continued from its inaugural success in 2009 to focus on topics such as tropical green architecture and green building case studies. The 2011 conference also examined new topics such as sustainable construction, buildings of the future as well as sustainable operations and maintenance.

Locally, we are continuing to work towards our national target of greening at least 80 per cent of all buildings in Singapore by 2030. Besides emphasising good design and technologies to enhance sustainability in buildings, we are also reaching out to the public to share the importance and benefits of adopting best green practices in their daily lives through our roving community-based Green Building Exhibitions. **To further encourage responsible users' behaviour, the various new BCA Green Mark schemes, such as the Green Mark for Existing Residential and Existing Schools as well as the Green Mark for Restaurants scheme, would recognise the collective efforts of users in adopting green initiatives to improve the overall environmental sustainability of their buildings and surroundings. ▶**

● CHAIRMAN'S MESSAGE

SAFETY – ALWAYS A PRIORITY

As the regulator of building safety in Singapore, BCA has also been consistently keeping checks on our built environment by reviewing regulatory frameworks and legislations to ensure that our buildings remain safe for the public. **The upcoming year will see a major transition for the industry with the migration of the existing British Standards to Eurocodes. To ease the transition, BCA will work with related agencies to organise training courses for the industry and will provide a grace period for the Eurocodes to co-exist with existing standards.**



In addition, BCA is taking up a new function as the lead agency in the regulation of amusement rides. A new regulatory framework has been introduced in July 2011 to protect the safety of ride-goers in Singapore, especially as more large-scale theme parks with more complex amusement rides are being developed.

QUALITY – CONSISTENTLY RAISING THE BAR

Like the BCA Green Mark, BCA's CONQUAS® system has also been well-received in the region. CONQUAS® is recognised as a benchmark of quality standards and several countries have even adopted the assessment systems in their local standards. In Singapore, both CONQUAS® and Quality Mark (QM) have also seen a high take-up rate in new private residential developments with new homeowners being more satisfied with their Quality Mark homes. **As part of our efforts to further promote these quality standards to more developers and homeowners, BCA will also be reaching out to the QM homeowners to garner feedback on the scheme.**

FRIENDLY – DESIGN WITH A HEART

A truly responsible nation cannot forget the needs of those who may be in one way or another inconvenienced by physical limitations. Therefore, central to our mission is an ever important task to create an inclusive built environment for everyone, regardless of age or needs. Over the years, BCA has been inculcating the importance of universal design in a barrier-free environment through the BCA Accessibility Masterplan and has been encouraging building owners to enhance the user-friendliness of their buildings, especially if these buildings are frequented by the public. **We are also engaging our youths through our “Nurturing the Young” industrial attachment programme to share with them the importance of having good design in a building to cater to the diverse needs of building users.**

FUTURE DIRECTIONS

Indeed, BCA's role goes a long way to being more than just a regulator. We also aim to foster a productive, sustainable and socially-responsible society. To achieve this goal we need innovative ideas and a strong conviction that each and every one of us can make a difference, no matter how small, if we put our hearts to it. BCA needs the continued strong support of passionate individuals and committed firms. Let us continue to work together to meet new challenges and achieve our target of developing the best built environment for Singapore, our distinctive global city.

QUEK SEE TIAT, CHAIRMAN

FIGURING IT OUT

■ SUSTAINABLE CONSTRUCTION CAPABILITY DEVELOPMENT FUND:

\$2.16 million
committed for 25 projects

■ GREEN MARK PROJECTS IN SINGAPORE:

758

■ GREEN MARK GROSS FLOOR AREA (GM GFA) INCENTIVE SCHEME:

61 applications received



BCA GREEN MARK



CONSTRUCTION PRODUCTIVITY AND CAPABILITY FUND

540 companies benefitted from the Construction Productivity and Capability Fund, worth **\$8.08** million.

CORENET

2.42 million e-submissions were carried out via CORENET

\$2.1 billion
worth of overseas
construction
contracts clinched
in 2010

28,810 advertisement licenses issued

140,052 household shelters and
2,881 storey shelters in public
and private residential buildings
were commissioned

44 public shelters and **23** transit
shelters were tested and commissioned

2,866 Management Corporations
in Singapore

25,215 lifts lodged with BCA

Close to **9,100** CoreTrade personnel registered with BCA

27 Trade Tests offered at **25** Overseas Testing Centres

22,144 workers and **13,422** PMETS have been trained
by the BCA Academy:

■ **725** for Green Mark Certification Programmes

■ **123** for CONQUAS®/Quality Mark
Management Programmes

■ **305** who have undergone productivity
enhancement training

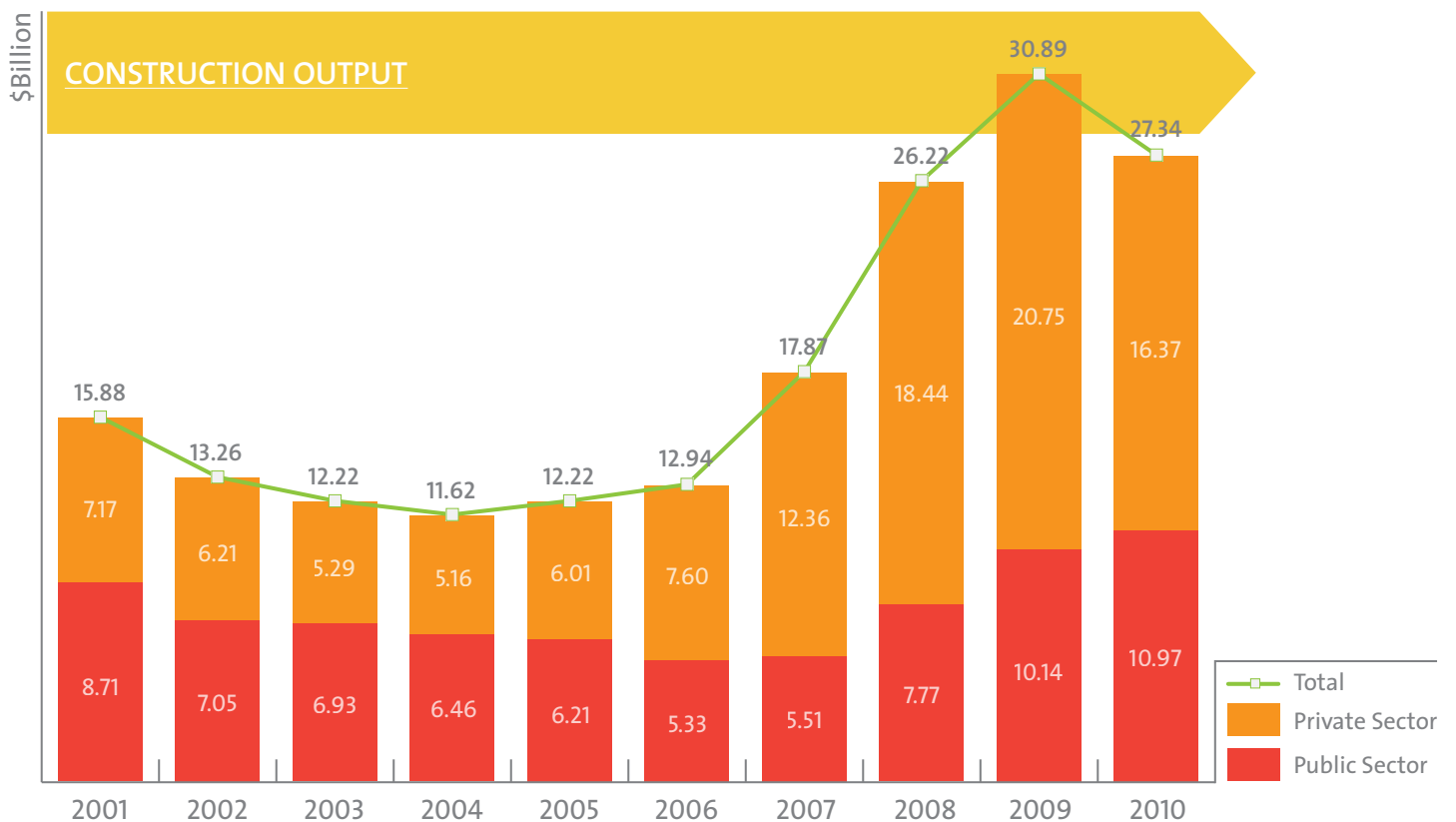
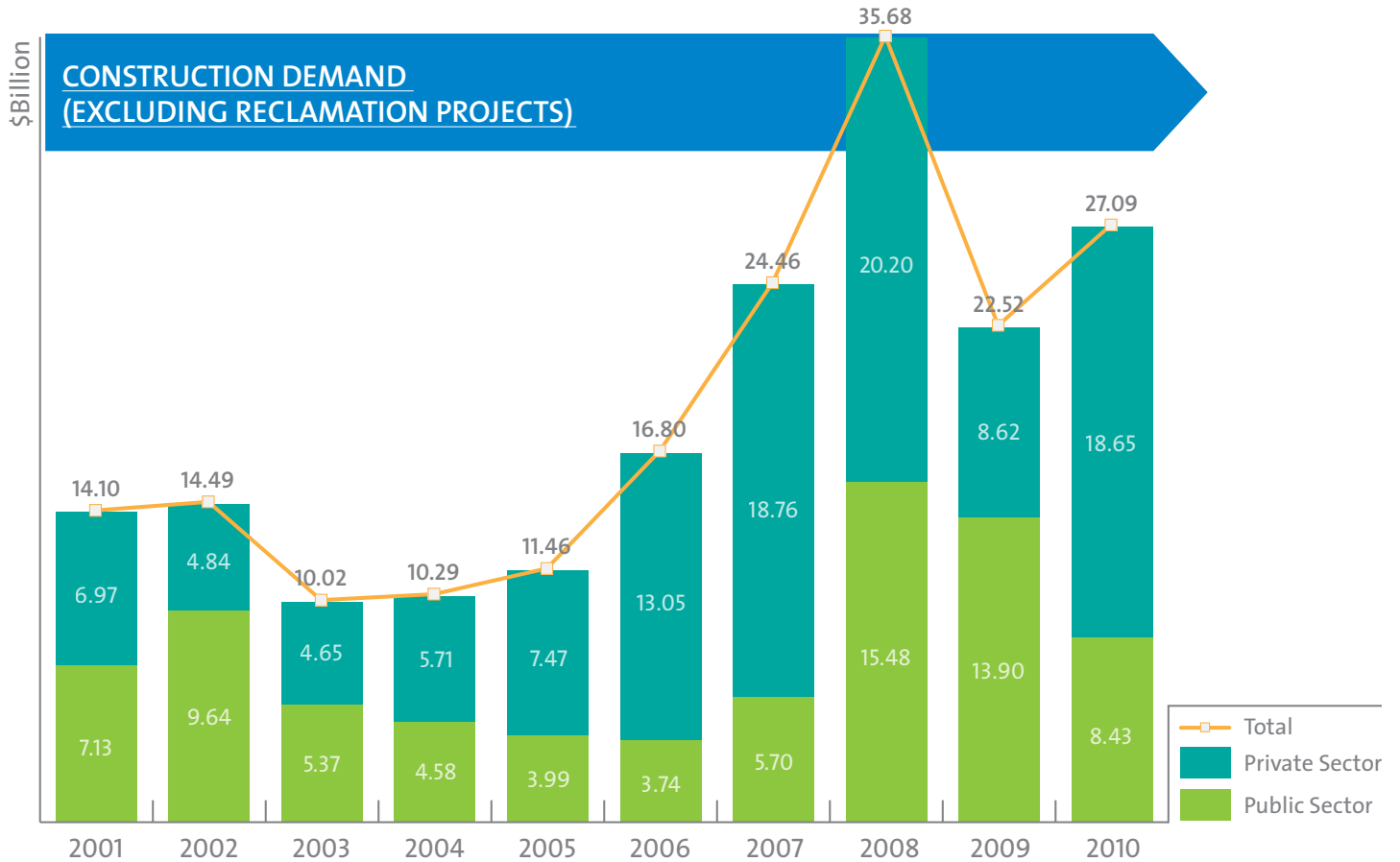
■ HIGHEST CONQUAS® SCORE FOR A BUILDING:

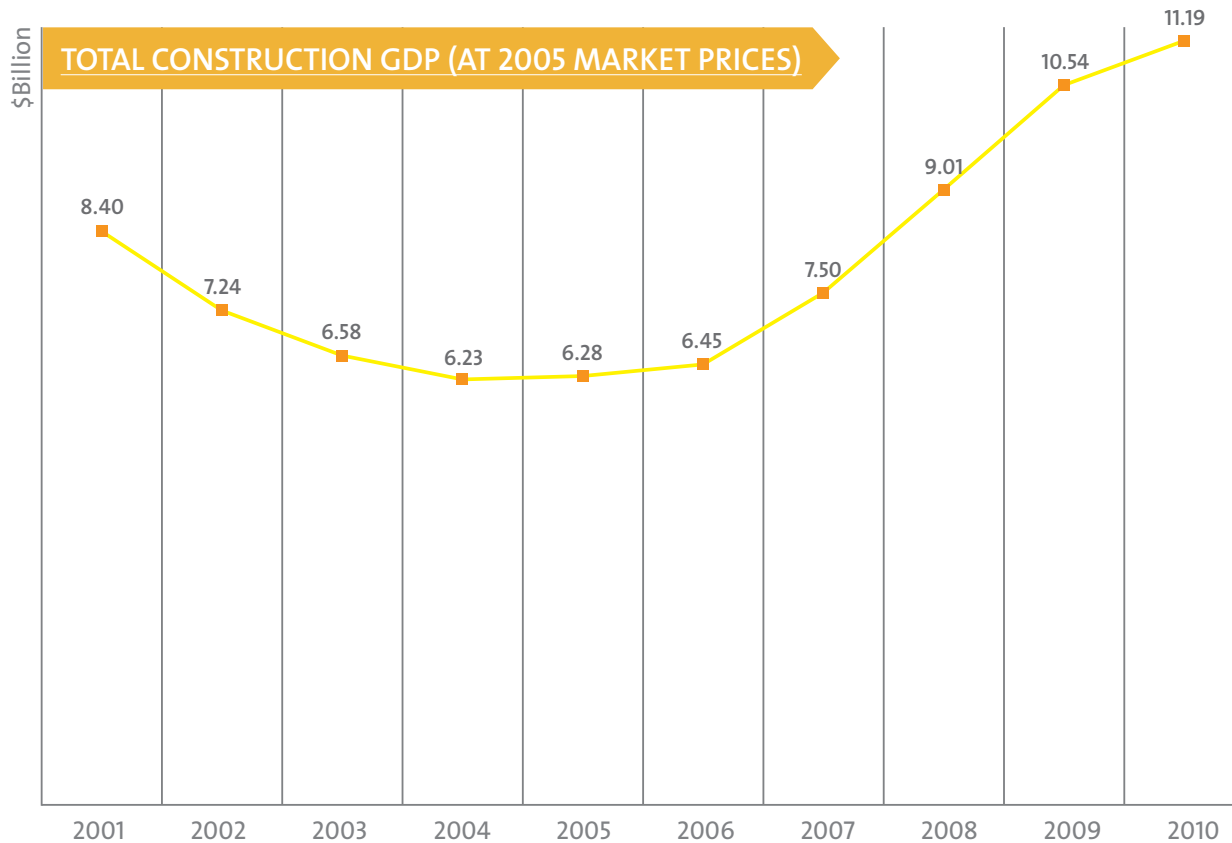
96.2

■ NUMBER OF RESIDENTIAL UNITS
COMMITTED TO QUALITY MARK:

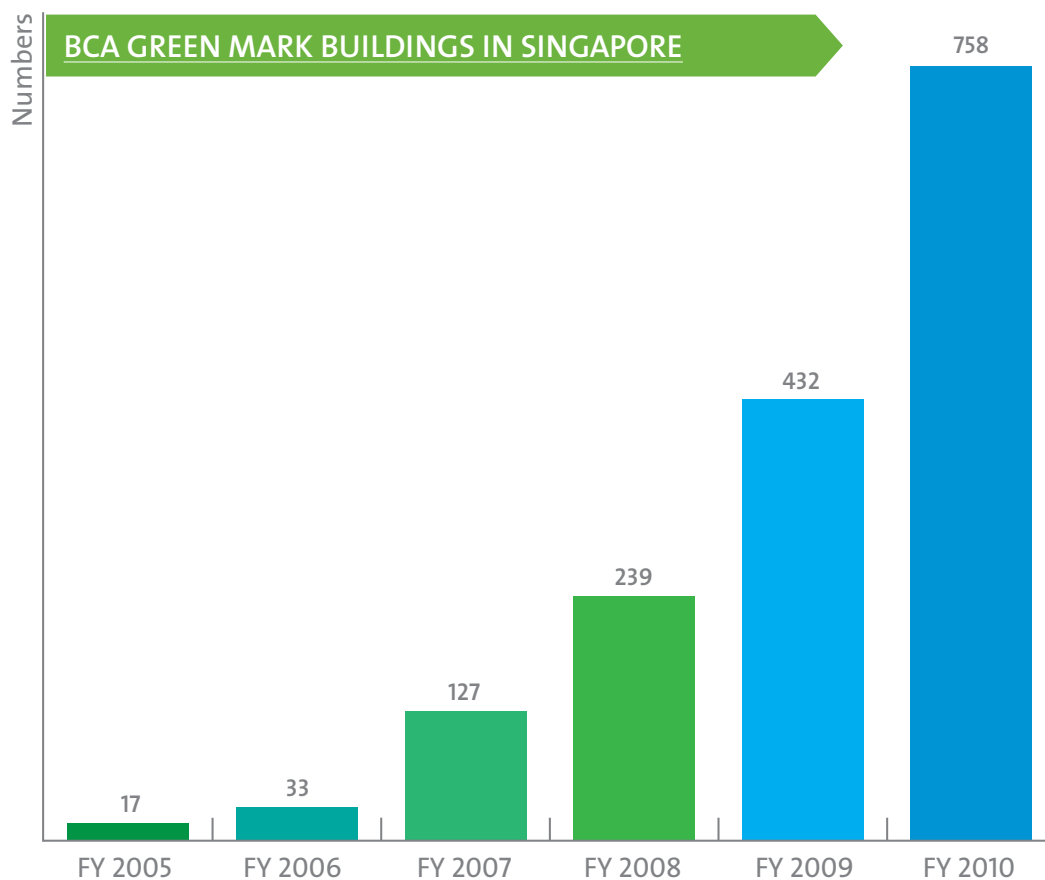
close to **40,000**

NOTABLE TRENDS





Source: Singapore Department of Statistics



● BOARD OF DIRECTORS

MR RICHARD HASSELL

[From April 2009]
Founding Director
WOHA Architects Pte Ltd

MR HO TONG YEN

[From April 2011]
Chief Executive Officer,
Sino-Singapore Tianjin
Eco-City Investment and
Development Co. Ltd

MR NORMAN IP

[From April 2009]
Advisor,
The Straits Trading
Company Limited

MR KEVIN WONG

[From April 2009]
Group Chief Executive Officer,
Keppel Land Limited

MR JOHN LIM

[From April 2009]
Senior Director,
Homefront Security Division,
Ministry of Home Affairs

MR LEE FOOK SUN

[From April 2011]
President,
Singapore Technologies
Electronics Ltd

MR LEE CHUAN SENG (DEPUTY CHAIRMAN)

[From April 2003]
Chairman,
Beca Carter Hollings &
Ferner (SEA) Pte Ltd

MR PEK LIAN GUAN

[From April 2007]
Managing Director,
Tiong Seng Contractors (Pte) Ltd

THE MOVERS AND SHAKERS OF BCA

MR FREDERIC PEREZ

[From April 2007]
Project Director,
Dragages Singapore Pte Ltd

MR LAI HUEN POH

[From April 2011]
Managing Director,
RSP Architects Planners
& Engineers (Pte) Ltd

PROF BERTIL ANDERSSON

[From April 2011]
President,
Nanyang Technological University

DR JOHN KEUNG

[From April 2006]
Chief Executive Officer,
Building and Construction Authority

MR QUEK SEE TIAT (CHAIRMAN)

[From 2001, Appointed Chairman
since April 2006]
Partner and Deputy Chairman,
PricewaterhouseCoopers, Singapore

THE MOVERS AND SHAKERS OF BCA

MR NEO CHOON KEONG

Director, Manpower &
Strategic Policy Division

MR CHIN CHI LEONG

Director, Building Plan
& Management Division
Commissioner of Buildings,
Commissioner of
Amusement Rides Safety

MR LAM SIEW WAH

Deputy CEO,
Industry Development

MR CHENG TAI FATT

Director, Corporate
Development Division
Deputy Managing Director,
Corporate Services
(BCA Academy)

MR ANG KIAN SENG

Director,
Research Division

MR CHOO WHATT BIN

Executive Director, Services

MR ONG CHAN LENG

Director, Special
Functions Division

MR KOH LIN JI
Director, International
Development Division

MR CHEW KEAT CHUAN
Director, Building
Engineering Division

MR WILLIAM TAN YONG KEH
Director, Business
Development Division
Director, Construction
Productivity Centre

MR TAN TIAN CHONG
Director, Technology
Development Division
Director, Construction
Productivity Centre

MR WONG WAI CHING
Deputy Managing Director,
Training & Professional
Development (BCA Academy)

MR ONG SEE HO
Deputy CEO,
Building Control
Commissioner of Building Control

MR BENEDICT TAN
Managing Director
(BCA Academy)

DR JOHN KEUNG
Chief Executive Officer



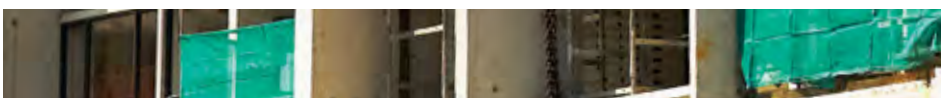
THE NEXT LEVEL


– RAISING PRODUCTIVITY



“Productivity has always been our strategic target, which is why we focus heavily on streamlining work processes to optimise project efficiency. Improving our project management capabilities also helps us stay competitive.”

Yes Construction Pte Ltd





THE ONLY WAY FORWARD FOR THE BUILDING AND CONSTRUCTION INDUSTRY IS UP.

THE ECONOMIC STRATEGIES COMMITTEE (ESC) had recommended for Singapore to make significant improvements in productivity in every sector of the country's economy in order to achieve productivity growth of two to three per cent a year over the next 10 years. Singapore's building and construction sector responded swiftly to the challenge, by reviewing existing policies, identifying gaps and recommending strategies to raise productivity.

To make the successful quantum shift to higher economic growth, a \$250 million Construction Productivity and Capability Fund and a Construction Productivity Roadmap were introduced to help the sector raise productivity and build capability. ▶

WHAT IS THE CONSTRUCTION PRODUCTIVITY ROADMAP?

The roadmap is a four-pronged approach that strives to enhance productivity in the construction sector.

IN BETTER COMPANY
Incentivise firms to adopt technology and build capability.

THE SMARTER WORKFORCE
Enhance the quality of the construction workforce through CoreTrade and tiered-levy.

CONSTRUCTION PRODUCTIVITY ROADMAP

MAN NUMBERS DOWN, LEVY UP
Regulate the demand of foreign workers through Man-Year Entitlement (MYE) cuts and increased levy.

MAKING THE RULES
Impose regulatory requirements and standards through raising buildable design requirements, introducing the constructability score and making BIM e-submission mandatory.



01 Use of system formwork in lieu of traditional formwork to improve site efficiency | 02 Raising the skills and capability of the workforce is crucial in realising the vision of higher productivity | 03 Drywall installation eliminates wet trades and speeds up construction

WORKFORCE DEVELOPMENT: WORKING FROM THE GROUND UP

The spine of the building and construction industry has always been its workforce, and raising the quality of both the local and foreign talent pool is crucial in realising the vision of higher productivity. In a bid to keep costs low, firms had often turned to a lower-cost and lower-skilled pool of foreign workers, which resulted in an unproductive and transient workforce.

• BUILDING A CORE WORKFORCE

Retaining experienced workers and upgrading their skills will cut down on unnecessary re-training and ensure that a core workforce can be grown and leaders evolve naturally from within the pool.

BCA has worked closely with the Ministry of Manpower (MOM) to implement a tiered-levy framework to incentivise companies to retain and upgrade their skilled employees. MOM is also gradually reducing the Man-Year Entitlements (MYEs) quota allotted to construction

projects, to steer the industry towards more efficient use of workers and greater adoption of technology.

BCA has also enhanced the Construction Registration of Tradesmen (CoreTrade) scheme, which was introduced in end 2008, to expand the list of higher value-added construction trades recognised under the scheme – raising the number from 7 to 17. The CoreTrade scheme aims to build a core group of competent and experienced tradesmen by providing a clearer career progression path and recognition for their efforts through the registration system. Class 1 General Builders undertaking projects valued at \$20 million and above are required, under law, to deploy registered CoreTrade personnel in the projects.

This results in qualified, skilled and experienced supervisors and tradesmen in the construction industry. Each of them represents the building blocks to higher productivity and capability.



“We are single-minded about boosting productivity in the entire construction value chain in a sustained manner and it is necessary to look at all possible avenues to realise our mission...”

BCA CEO, Dr John Keung, at the 2010 International Panel of Experts (IPE) meeting on Construction Productivity and Prefabrication Technology



TECHNOLOGICAL ADOPTION: THE ONLY WAY IS FORWARD

To accelerate the advancement of the industry, BCA recognises that technology and its widespread adoption is key. Grants have been committed to help firms adopt new innovations, purchase cutting-edge equipment and re-engineer processes that would significantly improve productivity. This includes conducting studies and commissioning projects to increase efficiency and output.

• ENHANCING THE FRAMEWORK FOR BUILDABILITY AND EASIER-TO-CONSTRUCT BUILDINGS

Started as legislation for buildable design in 2001, the Buildable Design Score aims to promote efficient building design. Over the years, the requirements (score) were progressively raised to steer designers to deliver better and more practical designs for the builders so it would be easier for them to adopt efficient methods and advanced technologies in their projects. Under this framework, designers will work out a Buildable Design Score to determine how efficient and less labour-intensive their project is designed to be. Recently, the requirements were tightened to bring about a wider use of buildable and less labour intensive designs such as prefabrication and precast.

From July 2011, the new Constructability Score, which measures the impact of downstream construction methods and technologies, will steer builders to adopt productive construction methods.

Builders will score favourably if they adopt productive methods on-site.

• BUILDING INFORMATION MODELLING (BIM)

The 3D BIM has been identified as a key technology driver to improve the level of integration and collaboration across various disciplines in the building lifecycle. It is poised to help the construction industry achieve a new level of excellence, leading to higher productivity gains with less construction conflicts and rework, minimal wastage of resources and more sustainable building designs.

• EXPERT INSIGHTS

In August 2010, BCA tapped on global expertise for ideas on raising construction productivity. The forum was the very first International Panel of Experts (IPE) meeting on Construction Productivity and Prefabrication Technology. Luminaries from Netherlands, Germany, United Kingdom, United States, Australia, Japan and Hong Kong convened with local experts to discuss and put forward their recommendations.

The result of this inaugural meeting was the sharing of insights on how different countries managed construction productivity, as well as recommendations on how these methods could be adapted and implemented in Singapore. They included the use of modular co-ordination among designers and developers to improve industry-wide communication, optimum use of precast and prefabrication to reduce manpower, save time and costs, as well as raise awareness among the professionals and youth on the importance of good design from the start. ▶

“Innovation is key to our success. Through innovative thinking, we influenced our consultants and builders to adopt sustainable, easy and safe-to-build best practices such as extensive prefabrication...We are also endorsing the Building Information Modelling format to improve productivity for design, construction and even facilities management of our projects.”

City Developments Limited

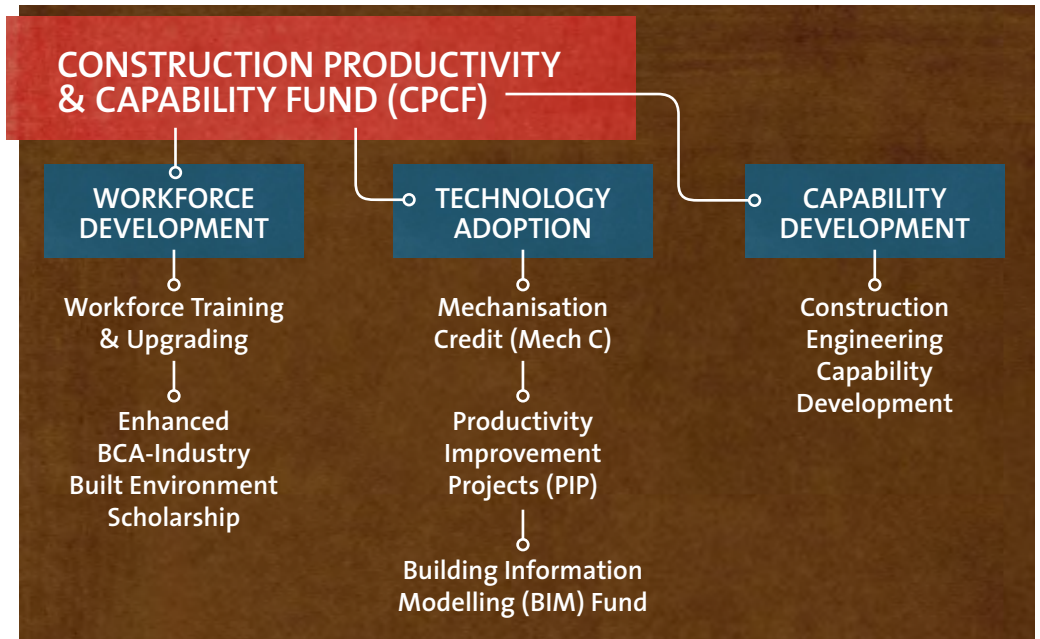
CAPABILITY DEVELOPMENT: NEVER A SIMPLE SOLUTION

The urban landscape promises more and more complex projects. Just look at Singapore and the list of awe-inspiring building designs that have come up of late. To ride this wave and ensure that builders are able to shape the skyline of the future, they must undertake complex construction projects to build up their capabilities. Funding will be a means to help build up manpower and engineering capabilities, helping Singapore to realise its vision for progressive builders with specialised capabilities.

• FUNDING AND OPPORTUNITY

BCA established the Construction Productivity Centre (CPC) and Centre for Construction IT (CCIT) to enhance industry outreach efforts. It also set up the Construction Productivity and Capability Fund (CPCF). This Fund, with recent enhancements, is set to raise funding support to firms for the adoption of new technologies and methodologies in place of labour. There is also assistance for firms in the industry to build capability in complex projects.

In April 2011, BCA organised the inaugural Singapore Construction Productivity Week. Highlights of the week include an exhibition of productive construction technologies by firms from around the world, a Skilled Builder Competition, a BIM Competition for students and professionals and a tour of exemplary sites that have enhanced their productivity. The anchor event of the week, the Build Smart Conference, was held alongside the BuildTech Asia 2011 Exhibition.



THE SKYLINE IS THE LIMIT...

This visionary, multi-pronged Construction Productivity Roadmap is single-minded in its objective for the construction industry – embrace change and understand the demands of tomorrow’s building industry, today.

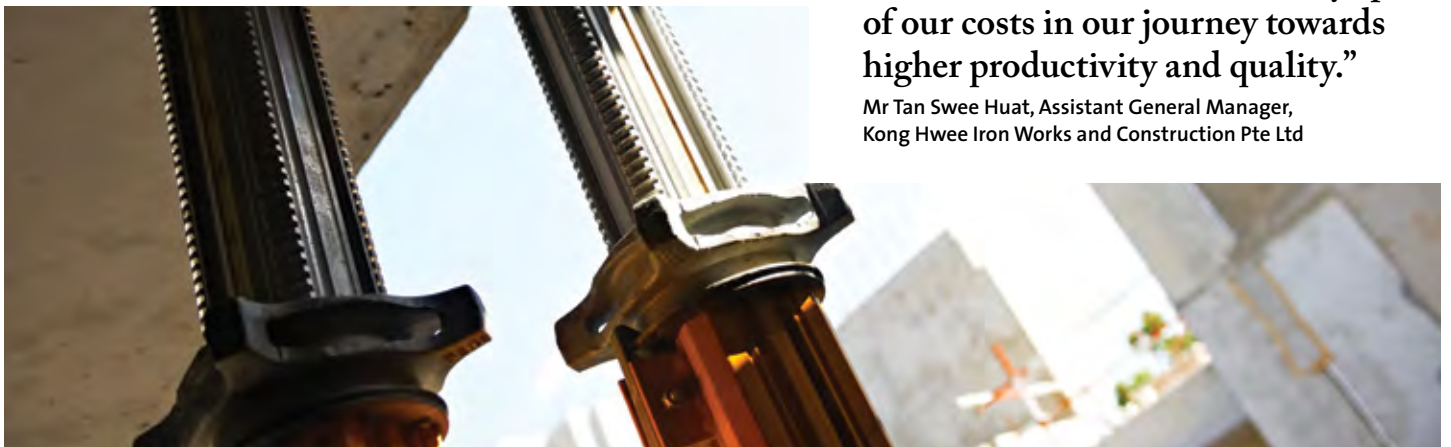
It is an uphill challenge made easier by the hard work and passion of BCA and its supporting agencies, and commitment from all stakeholders. Together, we will meet the objectives of the roadmap to transform and upgrade the current workforce, nurture leaders within the industry, and leverage on the power of technology for a world of possibilities. **BCA**

“The introduction of the CPCF schemes by BCA has encouraged us to explore ways to re-engineer current construction practices to improve productivity, and the Productivity Improvement Project has definitely facilitated the implementation of the new system in our building works.”

L.S. Construction Pte Ltd

“The launch of this Construction Productivity and Capability Fund is good news for the industry. We find the Mech C scheme under the CPCF to be the most useful as it defrays part of our costs in our journey towards higher productivity and quality.”

Mr Tan Swee Huat, Assistant General Manager,
Kong Hwee Iron Works and Construction Pte Ltd





01



02

“Chang Hua Construction (CHC) is moving away from traditional construction methods and looking into new ways to enhance on-site construction productivity. We’re planning to raise CHC’s productivity by adopting new construction technologies and developing our workforce.”

Mr Li Fei Chang, Managing Director, Chang Hua Construction Pte Ltd



03

01 The faster set up time of machines such as the spider lift increases productivity on-site | 02 Lifting of precast concrete components for site installation | 03 System formwork for slab construction

ENTER THE DIGITAL AGE

— BUILDING SMART WITH BIM

BCA USHERS IN THE THIRD DIMENSION WITH THE BUILDING INFORMATION MODELLING (BIM) SYSTEM

SET TO COMPLETELY CHANGE THE WAY A BUILDING IS DESIGNED AND BUILT, BIM is by far one of the most exciting developments in recent years. With its potential to propel the industry by improving productivity and enhancing capability, it is one of the key technologies identified under BCA's \$250 million Construction Productivity and Capability Fund (CPCF).

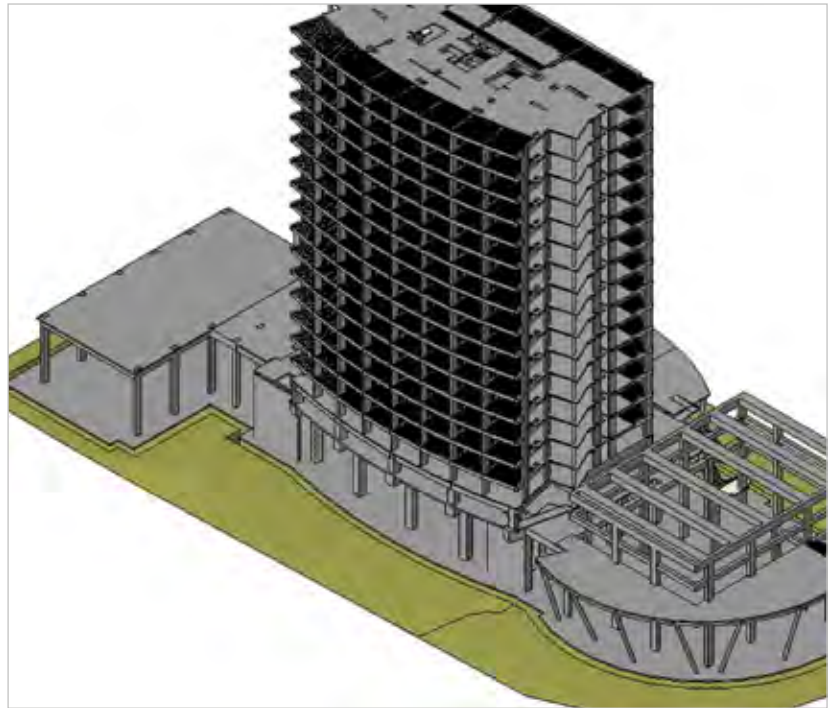
THE THIRD DIMENSION

More than just a 'visual aid', BIM is a three-dimensional modelling technology that allows building professionals to digitally 'enter' and 'experience' an entire project, before it is built. It is also a tool that accurately represents the smallest detail, allowing them to identify and resolve design conflicts before construction work starts.

With BIM, architects, engineers and contractors are able to better communicate with one another and work together in an integrated and collaborative manner.

The cost savings that this technology will bring to the building and construction industry is potentially very large, and with increased efficiency between partners, projects of all complexities will be better managed with no compromises on safety.

Following the success of Architectural BIM e-submission in 2009, BCA started roping in other industry stakeholders so that they can also reap the benefits of using BIM. The BIM design templates for structural as well as mechanical and electrical BIM e-submissions were subsequently developed together with other regulatory agencies.





01 Officers getting a grasp of BIM

“With the ability to simulate and visualise 3D models on the computer screen, we are able to study interfacing details and ‘cut’ sectional drawings at a click of the mouse. We were (also) able to accurately visualise all critical interfacing details as well as identify potential problems and clashes between different elements.”

Mr Low Leong Leong, Senior Architect, Woh Hup Pte Ltd

From April 2011, structural and M&E BIM e-submissions were accepted for regulatory approval as well.

GREEN THROUGH BIM

With sustainability rapidly emerging as the new global mantra, designers will be able to perform energy analysis on their virtual building models. Industry professionals can now spend more time on high-value simulation and design activities, rather than dealing with mundane 2D documentations and re-submissions. BIM is no longer a luxury but a necessary tool to help practitioners innovate and design more sustainable buildings.

TRAVELLING AT LIGHT SPEED

Like all things new, BIM has a learning curve which BCA is actively addressing. While the technology will accelerate the advance of the industry, BCA recognises that training and support must be rendered so that no one lags behind.

For starters, BCA has built up a core team of BIM specialists within its Centre for Construction IT (CCIT) to provide ‘chaperone’ services for first-timers on BIM projects. CCIT is set to build capability and capacity within the industry, and encourage more companies to adopt the technology, especially the public sector which BCA envisions to be the leader and demand generator for BIM.

BCA has also engaged institutes of higher learning to incorporate BIM as part of their curriculum ▶

386

BIM E-SUBMISSIONS
MADE BY 88 PROJECTS
IN 2010

THE BIM DIFFERENCE

- Improves overall integration and collaboration across various professionals in the building and construction industry
- Leads to higher productivity and reduces wastage of resources with the use of 3D modelling
- Enables architects and builders to design more sustainable buildings with less conflicts and reworks
- Delivers greater cost savings as all gaps and design issues are addressed at the modelling stage
- Enables designers to perform energy analysis to better ‘green’ their projects
- Injects greater creativity into projects with its in-depth 3D modelling tools
- Saves time and costs through the use of standardised submission templates

**\$1.47
MILLION**

BIM FUND AWARDED TO
38 FIRMS SINCE JUNE 2010

**\$6.0
MILLION**

BIM FUND TO ACCELERATE
ADOPTION OF BIM TECHNOLOGY

AT LEAST
**20%
IMPROVEMENT**

IN MANPOWER SAVINGS AND
PROJECT TIMELINE

SUCCESS STORIES

ARTSCIENCE MUSEUM AT MARINA BAY SANDS

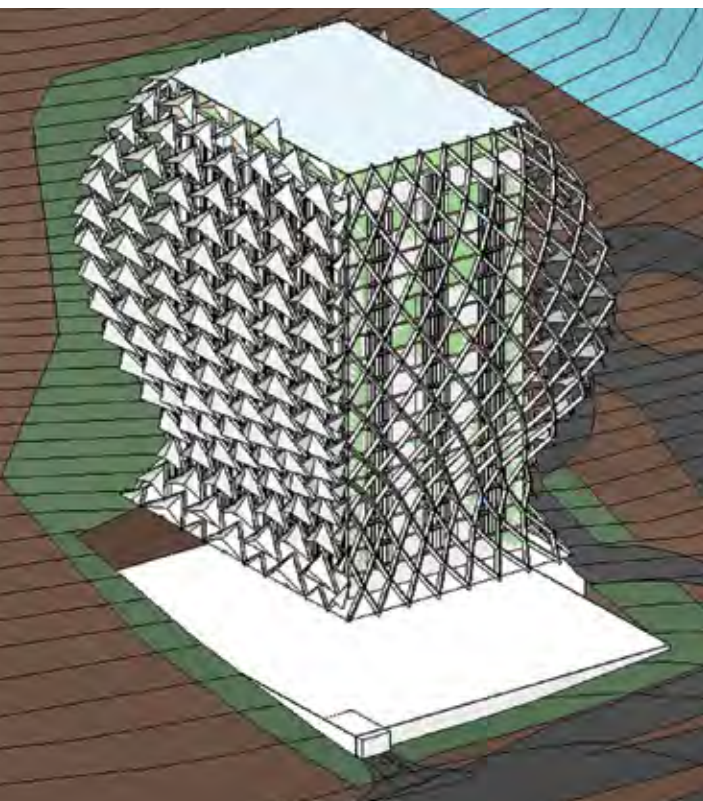
Structural Designer: Arup Singapore
BIM helped in delivering millimetre-accurate models ready for steel fabrications, which cut down risks to both the client and contractor, as well as provided major time savings in the design and build schedule. Utilising BIM for this project reduced the time for tender documentation from the conventional 6–12 months to just **3 months**.

HOUSING & DEVELOPMENT BOARD (HDB)

For two of its recently completed housing projects, the Housing & Development Board utilised BIM templates for modelling and regulatory submission – using its framework and documentation for the purpose of the construction's tender. As a result, they achieved an amazing **40–45 per cent in manpower savings**, translating to large project cost savings.

BECA CARTER HOLLINGS & FERNER (SEA) PTE LTD

The major local design consultancy firm started piloting BIM in its projects and claimed a 20 per cent improvement in productivity for the drafting process.



from this year. Graduating students will have intensive BIM training before joining the industry. BCA has even introduced a Specialist Diploma in BIM to equip and familiarise industry professionals with the fundamental knowledge and skill sets required to deliver and coordinate BIM projects.

To further accelerate the adoption of BIM technology, about \$6 million has currently been set aside under the Construction Productivity and Capability Fund to aid companies financially in training, consultancy as well as software and hardware implementation. The target is to get 80 per cent of the industry to use BIM widely by 2015.

With these and more support initiatives on the horizon, the use of BIM by the industry will proliferate and ultimately drive the transformation of the building and construction industry. **BCA**

“Once the adoption of BIM technology is established industry-wide, with available trained staff and more economical hardware, then holistic and integrated projects would be achievable with time better devoted to improving design rather than fire-fighting co-ordination problems and abortive works.”

Mr Loh Ju Hon, Director,
RDC Architects Pte Ltd

AN ATTITUDE FOR APTITUDE

GREAT PYRAMIDS, AMAZING BRIDGES AND BREATHTAKING SKYSCRAPERS. THEY ALL HAVE ONE THING IN COMMON – THEY WERE DREAMT UP, CONCEPTUALISED AND BUILT BY PEOPLE .

THE BUILDING AND CONSTRUCTION INDUSTRY is a world of mathematics, creativity, architecture and cutting-edge technologies. It is also a larger-than-life environment of complex structures and sky-scraping monuments. Talents – architects, engineers, builders, quantity surveyors, men on the ground – they are the building blocks and the engines that continue to push the limits and advance the industry to new and exciting levels. This is why training and a mindset towards continually upgrading the talent pool are of utmost significance.



01 Valedictorian, Sun He, at the BCA Academy Graduation Ceremony 2010

CLASS IS IN SESSION

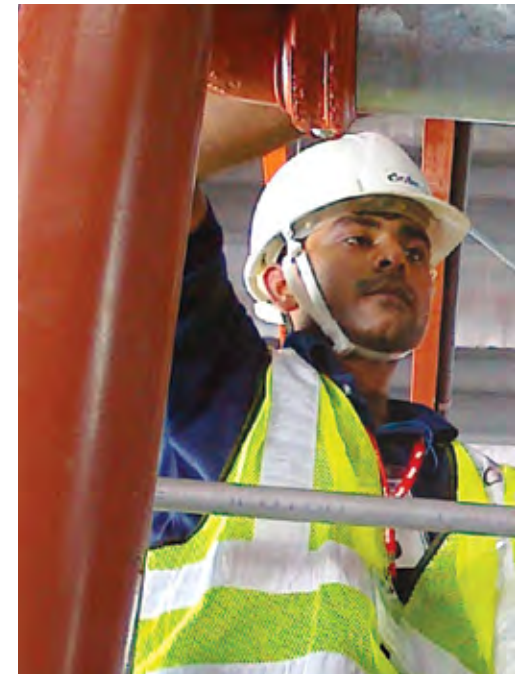
BCA Academy (BCAA), the education arm of BCA, offers a comprehensive range of training programmes for all levels in the workforce. Whether you are a newcomer to the industry or an industry veteran, there are programmes and courses that cater to your training and upgrading needs. This versatility is key to BCAA's mission in providing quality training and learning programmes for the development of an excellent built environment.

Since 1984, the Academy has seen thousands of qualified workers and professionals walk through its doors. Bright young sparks have turned into career professionals, and experienced individuals were able to refresh and advance their expertise. This year alone, BCAA

saw a total of 457 graduating students, including 359 specialist diploma holders. Armed with newly-acquired skills and knowledge from BCAA, these graduates had gained a firm foundation to exploit the many opportunities in the construction sector.

The success of the Academy is also grounded in its careful evaluation and consideration of what tomorrow holds for the built environment. The future of the industry rests on sustainability, productivity and professionalism. To meet these challenges and more, the Academy has created specialist centres hardcoded into its educational blueprint.

These centres are the Centre for Sustainable Buildings and Construction (CSBC), a dedicated research unit under BCA, housed ▶



in the Academy; the Centre for Construction IT (CCIT), set up in 2010 to spearhead the adoption of Building Information Modelling (BIM) to transform the way buildings are designed, analysed, constructed and managed; and the Centre for Workplace Safety and Health (WSH) Training in Construction, which aims to build up WSH capabilities of the construction industry.

BCA Academy has also stepped up the use of technology-based training methods to enhance the quality of its courses. For example, four new crane simulators were acquired to provide trainees with scenario-based training under simulated weather and loading conditions, which would not be possible with live crane training.

Complementing these initiatives is the Academy's energy to continually reach out to new students through events like its yearly open house as well as offering scholarships to outstanding performers. By continuing to scan for raw talent, and championing technology, research and development, BCA's mission to shape the future of Singapore's built environment is steadily gaining new heights.

SKILLS CERTIFICATION FRAMEWORK

Since 1995, new foreign workers entering the construction workforce

are required to pass a skills test under BCA's overseas skill certification framework. From 2005 onwards, all construction foreign workers must obtain the Skills Evaluation Certificate (Knowledge) – SEC(K), before they can be employed on the construction work permit. A total of 25 trade tests are now available at the 25 Overseas Testing Centres, spread over five countries. BCA certified more than 25,000 skilled workers in 2010.

CORETRADE REGISTRATION SCHEME

The Construction Registration of Tradesmen, or CoreTrade, is one of the key strategies to deal with the transient nature of the foreign workforce. It seeks to retain and build a stable pool of skilled and experienced construction personnel through its registration scheme.

It achieves this by providing these tradesmen a clearer career progression path and giving them due recognition for their efforts. Instead of generic positions, those who enter this registration scheme can see opportunities for advancement. Starting at the first rung of the ladder as a basic skilled worker, they are able to move up to advanced positions such as Construction Tradesman and, higher up, as Construction Trade Foreman. Their specialisations and unique talents will evolve as they

BCA'S COMPREHENSIVE TRAINING AND EXECUTIVE DEVELOPMENT PROGRAMMES

To shore up capabilities in the built environment and train new talents, BCA Academy has put in place several postgraduate and graduate programmes, as well as executive development programmes in collaboration with prestigious universities and institutions. The aim is to facilitate the exchange of ideas, innovations and keep abreast of trends in the global world of the built industry.





01 | 02 Workers taking the CoreTrade tests | 03 Scholars at the BCA-Industry Built Environment Scholarship Award Ceremony



do – benefitting not only themselves, but the industry in general, which will now be able to access a group of competent and experienced workers.

So far, the CoreTrade scheme has seen success – with more than 9,000 registrants since its commencement in 2008. Under the Building Control Amendment Act 2007, licensed Class 1 General Builders have to employ a certain number of registered CoreTrade personnel for projects valued at \$20 million or more. This translates to more than 350 projects valued at about \$36 billion deploying CoreTrade personnel.

The CoreTrade scheme is reviewed regularly to ensure its relevance – plans are in place to enhance the scheme by widening the range of trades to be registered, raising the man-year deployment requirements and strengthening the skill qualifications of workers registered under CoreTrade.

SCHOLARSHIPS FOR THE BEST MINDS

To further encourage more talented professionals, particularly leaders, movers and shakers, to join and advance the industry, the BCA has enhanced and expanded its BCA-Industry Built Environment Scholarship to attract more and better calibre students to join the sector.

Now, the number of scholarships has increased, and the total amount co-sponsored by the Government and participating private firms rose to \$14,000 a year – a 40 per cent increase from the previous sum pledged. In 2010, there was a record of 230 applicants and 34 scholarships awarded by 20 industry sponsors, a marked increase from the previous year.

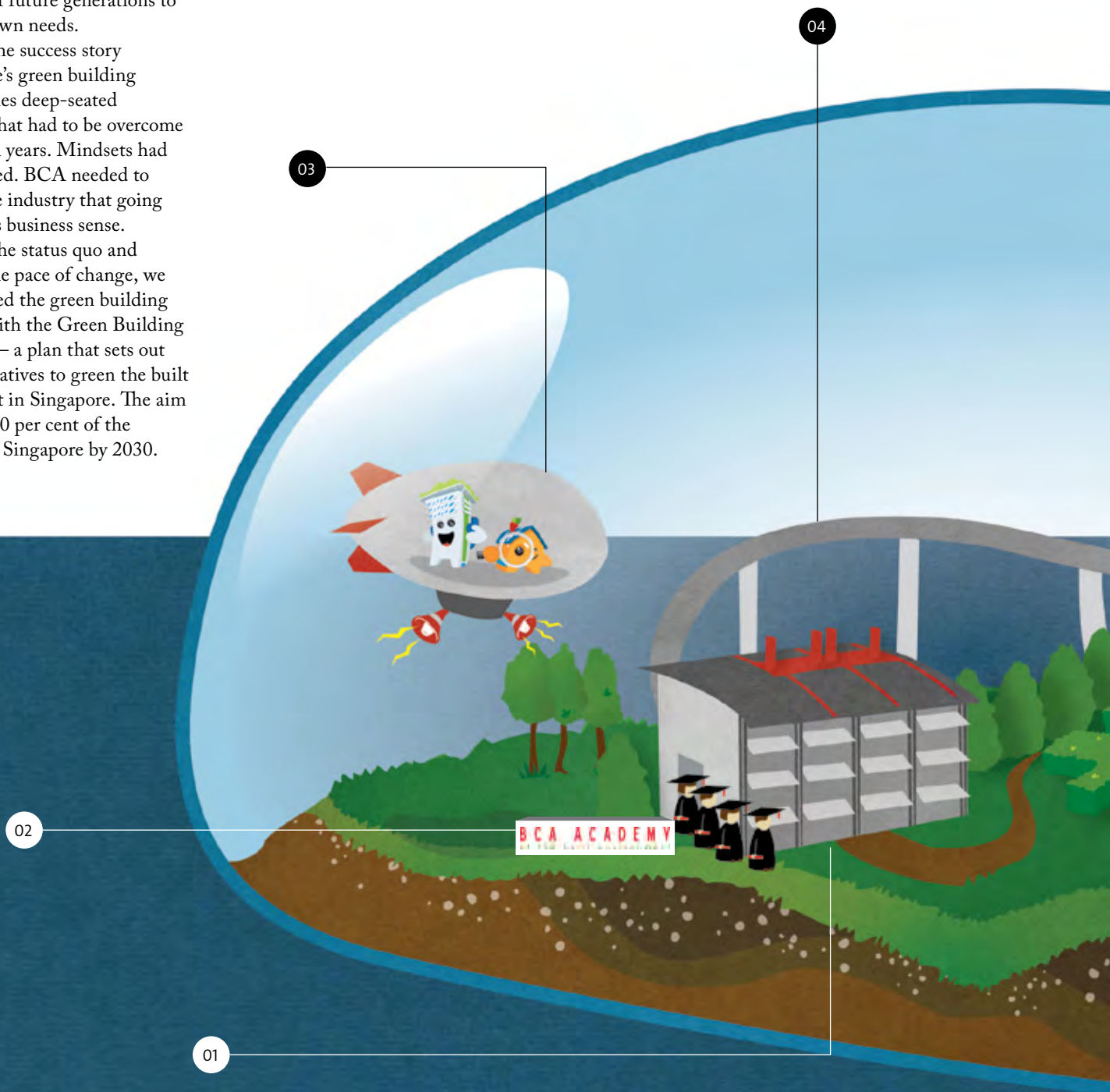
The way forward to consolidate the future of the built environment is not just technology or the latest building methodologies, but effective, talented and motivated people – on the ground at project sites and in the offices. This is the single most important element to ensure the success of the best built environment for Singapore. **BCA**

SENSE AND SUSTAINABILITY

ZERO ENERGY BUILDINGS, A TINY CARBON FOOTPRINT AND A GREEN CITY – ALL HALLMARKS OF A MORE SUSTAINABLE AND PROGRESSIVE SINGAPORE.

‘SUSTAINABLE DEVELOPMENTS’ refers to developments that meet the needs of the present without compromising the ability of future generations to meet their own needs.

Behind the success story of Singapore’s green building movement lies deep-seated challenges that had to be overcome in the initial years. Mindsets had to be changed. BCA needed to convince the industry that going green makes business sense. To change the status quo and accelerate the pace of change, we revolutionised the green building landscape with the Green Building Masterplan – a plan that sets out specific initiatives to green the built environment in Singapore. The aim is to green 80 per cent of the buildings in Singapore by 2030.



01 BUILDING CAPABILITIES THROUGH R&D

- Zero Energy Building to testbed new green building technologies
- \$50 million MND Research Fund for R&D in green building technologies
- \$5 million Green Mark Incentive Scheme – Design Prototype to encourage greater energy efficiency in buildings at the design stage
- \$15 million Sustainable Construction Fund to build capabilities in new sustainable construction technologies

02 GREEN PROFESSIONALS – TRAIN 18,000 TO 20,000 ‘GREEN SPECIALISTS’ BY 2020

- Created courses for Green Mark Managers and Professionals
- Trained more than 700 Green Mark Professionals, Managers and Facilities Managers
- Conducted 23 courses on sustainability including the Master of Science programmes in collaboration with the University of Nottingham and University College London

03 OUTREACH PROGRAMMES

- Inaugural BCA-CDL Green Sparks Competition
- Green Building Exhibitions
- BCA Green Mark Awards
- BCA Breakfast Talk for CEOs

04 NEW GREEN MARK SCHEMES BEYOND BUILDINGS

- Developed the Green Mark schemes for Parks, Districts, Office Interior, Landed Homes and Rapid Transit System

05 INTERNATIONALISATION OF BCA GREEN MARK

- More than 120 projects applied for BCA Green Mark certification in 10 countries

06 LEGISLATION AND GOVERNMENT TAKING THE LEAD

- All new buildings to meet minimum Green Mark certified standards since April 2008
- New public sector buildings that are air-conditioned to achieve Green Mark Platinum rating
- Existing government buildings to achieve Green Mark Gold^{Plus} standard by 2020
- Higher Green Mark standards for land sales in strategic growth areas

07 INCENTIVES

- Bonus Gross Floor Area for higher-tier Green Mark ratings
- \$100 million Green Mark Incentive Scheme for existing buildings
- Fully committed \$20 million Green Mark Incentive Scheme ▶



06

07

The BCA Green Mark, coupled with other attractive incentive schemes, has ‘greened’ more than 800 building projects in Singapore so far, contributing substantially to more energy efficient buildings. Apart from championing the Green Building Movement in Singapore, BCA had actively promoted the development of more sustainable buildings within the region. The BCA Green Mark is also sought after in 10 countries in the region, with more than 120 projects applying for the certification.

INAUGURAL BCA-CDL GREEN SPARKS COMPETITION

The competition was well received, with more than 150 students participating. NUS beat 19 other teams as they presented an insightful and comprehensive system to improve the energy efficiency of Fuji Xerox Towers to attain the Green Mark Platinum rating.



BCA has plans in the pipeline to rigorously build up the talent pool of green professionals, which include offering a range of training and development courses in collaboration with renowned universities overseas. Aside from training full-time students at the BCA Academy, BCA is also looking to develop leaders within the professional circles – nurturing Green Mark Managers, Professionals and Facilities Managers in the industry.

RESEARCH AND DEVELOPMENT (R&D)

On the R&D front, BCA collaborated with the UNEP Sustainable Building & Construction Initiative (SBCI) on two key projects. The first is a Regional Status Report that surveyed and reported on the current status and trends of sustainable building policies as well as the initiatives in the region. The second is a Common Carbon Metric Protocol launched by UNEP SBCI to measure and report on greenhouse gas emissions from buildings and establish energy performance baselines for buildings. The pilot trial of this new protocol will span multiple climate regions in Australia, Asia, Europe, India, North America and Africa.



01 BCA's Green Building mascots, Greco and Beco | 02 Public outreach at the Green Building Exhibition | 03 BCA CEO receiving the prestigious Aspen award

02



PUBLIC OUTREACH

Closer to home, BCA launched a series of eight roving Green Building Exhibitions since December 2009.

At the same time, we introduced two Green Building mascots, Greco and Beco, to excite, delight and educate the public on the benefits of green homes and buildings. In addition, BCA held interesting activities for the youths, such as design competitions and even an 'amazing race', where students had to search for specific green buildings in Singapore.

INTERNATIONAL RECOGNITION

BCA was conferred the prestigious **Energy and Environment Award (Government)** from **The Aspen Institute**, in recognition of its innovative and comprehensive green policies for Singapore's built environment in August 2010. This was the first time the award was conferred outside North America to a government agency for leadership in global issues.

Singapore was also **ranked first in Green Building policies in Asia-Pacific** over major cities like Tokyo, Sydney and Seoul. Our Zero Energy Building (ZEB), which is Southeast Asia's first ZEB, retrofitted from an existing building, also achieved



impressive results barely one year into its operation. The ZEB met the net zero power consumption during its first year of operation and accumulated a surplus of 25 MWh of electricity at the end of March 2011.

BCA had seen some noteworthy achievements over the year and these accolades serve as reminders for us to press on. The greening of our built environment will continue to be the way forward for a truly sustainable future. **BCA**

SUSTAINABILITY-RELATED COURSES AT THE BCA ACADEMY:

TRAINING AND DEVELOPMENT COURSES IN COLLABORATION WITH RENOWNED UNIVERSITIES OVERSEAS

- Master of Science in Sustainable Building Design (University of Nottingham)
- Master of Science in Facility and Environment Management (University College London)
- Bachelor of Science in Sustainable Facilities and Events Management (UniSIM and Singapore Polytechnic)

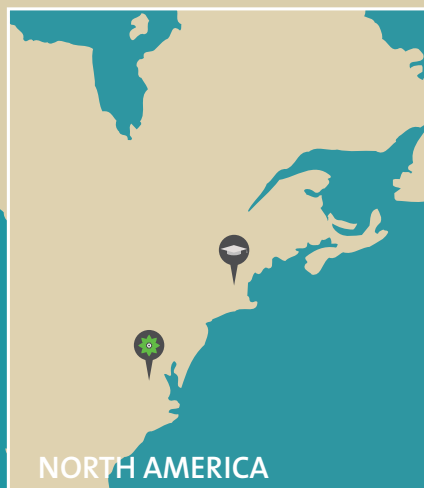
EXECUTIVE DEVELOPMENT COURSES

- Platforms for industry leaders to stay relevant with current trends, innovations and technology through dialogue with global institutions.
- BCA-HFT Stuttgart Executive Development Programme on Innovations in Sustainable Design & Technology
- BCA-Carnegie Mellon University Executive Development Programme on Leadership in Environmental Sustainability, conducted in Pittsburgh, USA



03

GOING GLOBAL



EXPANDING OUR REACH OVERSEAS

BCA played an active role in assisting local companies to expand their reach overseas. In 2010, our local firms clinched \$2.1 billion worth of overseas construction contracts. BCA also led five mission trips for 45 local firms to key target markets in the region. At the same time, there was a ramp up in the export of BCA's schemes to the region, particularly services related to green buildings. In 2010, BCA signed four Memorandums of Understanding (MOUs) with China and Bahrain to help build local green building capabilities within the countries as well as to promote Singapore's green building know-how and technologies in those markets.



RAISING BCA'S INTERNATIONAL PROFILE

With the aim of profiling Singapore as the regional hub for green building technologies, BCA participated in major international green building activities and events over the years. Recognised as a green building leader in the region, BCA also took the lead in the formation of the Tropical and Subtropical Green Building Council Alliance. Together with local companies, BCA raised the profile of the Singapore green building industry to be one that is synonymous with quality, capabilities and advanced technology.



BCA GREEN MARK

- > China
- > Malaysia
- > Vietnam
- > Brunei
- > India
- > Thailand
- > Saudi Arabia
- > Indonesia
- > The Philippines
- > Tanzania



CONQUAS

- > China
- > Malaysia
- > Hong Kong SAR
- > United Kingdom
- > South Africa



PARTNERING UNIVERSITIES

- > University of Nottingham (UK)
- > University College London (UK)
- > HFT Stuttgart (GERMANY)
- > Carnegie Mellon University (USA)



MEMORANDUMS OF UNDERSTANDING (MOUs)

- > Bahrain Ministry of Works
- > Sino-Singapore Tianjin Eco-City Administrative Committee
- > Beijing Construction Decoration Association
- > Guangzhou Development District Administrative Committee
- > Sikkim State Government
- > Construction Industry Development Council
- > American Society of Civil Engineers

BELIEVING IN SAFETY

'SAFETY FIRST' IS NOT JUST A REQUIREMENT IN THE BUILDING AND CONSTRUCTION INDUSTRY, BUT AN ATTITUDE AND A MINDSET IN EVERY PROJECT EXECUTED.

ENSURING THE STRUCTURAL SAFETY of buildings has always been a mission-critical function of BCA. It is a given that buildings in Singapore are built safe to live and work in. This would not be possible without a robust building control system that scrutinises the whole building cycle. ▶





FACING THE FACTS OF BUILDING CONTROL

HISTORY: The Building Control Act was promulgated on 1 April 1973.

The **Building Control Framework** requires developers to appoint an Architect to submit plans for non-structural works and a Professional Engineer to submit plans for structural works. During construction, the Architect and Professional Engineer will need to supervise the works and ensure that they are carried out according to the approved plans. BCA officers conduct selective inspections during critical stages of the construction works to ensure that the different parties, working on the project, including builders, carry out their duties diligently. If there are any contraventions of building regulations, BCA may revoke the permit and take enforcement action against the errant parties. Once the building works are completed, an audit inspection on the building works would be conducted before the issuance of the Temporary Occupation Permit (TOP).

KEY FEATURES: The **Accredited Checkers System** ensures structural designs and calculations are independently checked by senior and experienced Professional Engineers in the private sector.

The **Periodic Structural Inspection (PSI) Programme** requires building owners to engage a Professional Engineer to

carry out inspection of their buildings at regular intervals to ensure that structural deteriorations or defects are found and rectified early.

Licensing of Builders sets minimum standards of professionalism for builders to ensure that they are professionally qualified and competent.

MIGRATION FROM BRITISH STANDARDS TO EUROCODES

The structural design of buildings in Singapore has always been based on the British Standards. Recently, a new suite of European structural design codes for building and civil engineering works called the Eurocodes was developed and it is likely to be the de-facto standard – both in Europe and several other countries world-wide. In UK, the Eurocodes (BS EN version) are the new British Standards and conflicting British Standards were withdrawn in March 2010. Similarly, Singapore decided in 2006 to prepare to migrate to the Eurocodes. With that in mind, Singapore reviewed the BS EN version of the Eurocodes and published them as the new Singapore Standards (SS EN version) to be implemented within the next few years. BCA, together with SPRING Singapore, is currently preparing local consultants for the adoption of the Eurocodes SS EN version.





01 78 Shenton Way | 02 313@Somerset
| 03 City Square Residences



MORE THAN JUST BUILDING SAFETY: SAFETY OF OUTDOOR ADVERTISEMENT AND EXTERIOR BUILDING FEATURES

In addition to building structure considerations, BCA takes a firm stand on the exterior features of the building, such as outdoor advertisements and window safety. Blitzes are conducted to ensure that there are no illegal advertisements that would compromise the safety of the public. BCA also set 'Window Safety Days' on two easy-to-remember dates – 6 June (6/6) and 12 December (12/12). In the last few years, the number of fallen windows has dropped significantly – from 125 cases in 2005 to an average of 44.

SAFETY OF AMUSEMENT RIDES

In February 2011, BCA took on a new task to oversee the regulation of amusement rides in Singapore. The Amusement Rides Safety Act and Regulations were gazetted and subsequently implemented in July 2011. Under the new regulatory framework, all amusement rides are required to be designed and maintained in accordance with international safety codes. Training of Specialist Professional Engineers for the industry began in earnest, resulting in the registration of 14 such Professional Engineers in March 2011.

PRO-ENTERPRISE RANKING 2010

BCA's regulatory role is one that requires a fine act of balance between control, economy, relevance and expectations. In the Pro-Enterprise Ranking 2010, BCA was ranked fourth out of 26 government agencies. BCA showed strong performance for all components with Review of Rules rated the highest and Customer Responsiveness showing the biggest improvement from 2009.

Pro-enterprise as we strive to be, our first and foremost priority is still safety. **BCA**

HIGHLIGHTS OF ENGINEERING FEATS IN 2010

78 SHENTON WAY

This new building was built over an existing carpark and the columns were strengthened to support the weight of the additional seven storeys.

313@SOMERSET

A 10-metre wide fully functional Stamford Canal had to be diverted to pass through the new shopping mall. All these were done while the construction remained in close proximity to the MRT station and tunnel which were in operation.

CITY SQUARE RESIDENCES

Excavation works for three levels of basement were done in difficult sub-soil conditions, where a 20-metre layer of soft marine clay sits, without affecting the structural integrity of old shophouses in the vicinity.

INCLUSIVE BY DESIGN

RESPONSIBLE DESIGN FOR PEOPLE WITH VARYING NEEDS AND REQUIREMENTS IS THE NAME OF THE GAME FOR THE BUILT INDUSTRY.



01

WHEN DR JOHN KEUNG FIRST JOINED BCA as Chief Executive Officer, he had this vision, “While BCA is not a statutory board in charge of community development, we do have an important role to play in fostering a cohesive and resilient society. The extensive provision of accessible facilities and features enables people of all ages and needs to lead a quality life and communicate with one another. These facilities help ensure that no one is left behind and everyone can contribute and participate to make a difference in the community.”

ENHANCING ACCESSIBILITY

This vision laid the foundation for BCA’s Accessibility Master Plan, which included a review of the accessibility code. Subsequently, the scope of the “Code on Accessibility in the Built Environment”, which used to focus on barrier-free accessibility in buildings, was also expanded to beyond just buildings. It now covers inter-connectivity



02

“Universal Design (UD) is the design of products and environment to be usable by all people, to the greatest extent possible, without the need for adaptation or specialised design.”

Ronald Mace, who coined the term ‘Universal Design’



between buildings and their surrounding facilities.

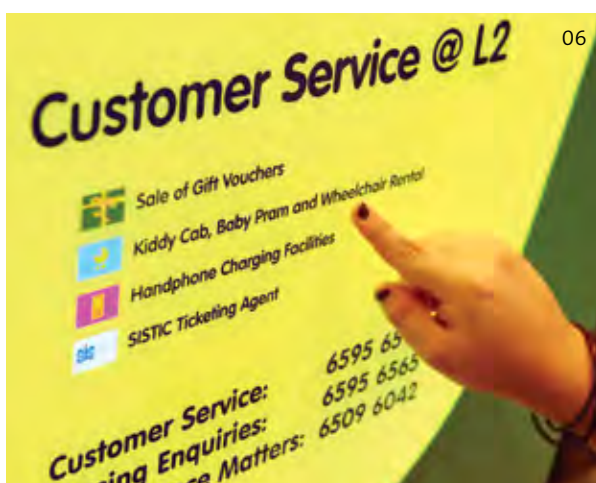
While the Code ensured that new infrastructure developments were accessible, the real challenge was upgrading the large stock of existing buildings built before the first Code on Barrier-Free Accessibility in Buildings was introduced in 1990.

BCA worked with various public agencies to take the lead in reviewing and improving the accessibility of their buildings. Upgrading programmes incorporating barrier-free features were carried out in housing estates, public transport infrastructure and public spaces owned by the public sector. To date, 98 per cent of public buildings that are frequented by the public have achieved at least basic accessibility.

For the private sector, BCA introduced the Accessibility Fund in 2007 and enhanced it later to help private building owners defray upgrading costs. BCA officers also persuaded building owners to install basic accessibility features in their buildings. ▶



01 | 04 Gentle ramps that mitigate differences in floor levels | 02 Wash basins designed for children | 03 Diaper changing station and nursing room for families with young children | 05 Two-level handrails at staircase for different groups of users, including elderly and children | 06 Clear signage in bright colours





07

“These facilities help ensure that no one is left behind and everyone can contribute and participate to make a difference in the community.”

Dr John Keung, BCA Chief Executive Officer



08

70

BUILDINGS
SUPPORTED BY
ACCESSIBILITY FUND

39

UNIVERSAL
DESIGN AWARDS
CONFERRED SINCE 2007

2,100

BUILDINGS
RATED FOR USER-
FRIENDLINESS



09



10



07 Demarcated crossing for the safety of pedestrians | 08 Designated parking lot for families | 09 Sheltered waiting area with seats | 10 Call points with clear signage strategically located | 11 Armrest for seats with holders for walking sticks



COMMENTS FROM STUDENT ON HER INDUSTRIAL ATTACHMENT TO BCA

“As a Year 3 Occupational Therapy student, the industrial attachment at BCA has helped in my professional development as an Occupational Therapist. The Accessibility Rating System audit has given me another perspective on the importance of accessibility in the community and how inaccessibility affects different user groups. The BCA Friendly Buildings online portal and continued efforts by BCA in raising awareness have allowed the public to understand the importance of barrier-free accessibility as well as know where the accessible buildings in Singapore can be located. Singapore is indeed moving to become a barrier-free nation that caters to all people.”

Goh Seok Teng, Occupational Therapy, Final Year Student

So far, 70 buildings, such as shopping malls and even religious institutions, have benefitted from the upgrading supported by the Accessibility Fund. BCA also started rating buildings that are frequently visited by the public to help users plan their visits to these buildings.

To ensure that no one is left behind, BCA actively promotes Universal Design, or UD, which means “designing for all people”. Besides barrier-free features, UD buildings have, among other amenities, pro-family features such as nursing rooms and child-friendly toilets to enhance their user-friendliness.

Currently, over 2,100 buildings in Singapore have some degree of accessibility. At retail haven Orchard Road, 85 per cent of the buildings have either committed to upgrade or achieved basic accessibility. BCA has also worked with HDB to incorporate Universal Design features such as ramps, sheltered walkways and clear directional signage in housing estates.

Each year, the BCA Universal Design Award is also given out to recognise buildings that have incorporated exemplary Universal Design within their premises – with 2010 seeing 13 winners, including Tampines Primary School, City Square Mall and City Green.

NURTURING THE YOUNG

To raise awareness amongst youths on the importance of accessibility and Universal Design, BCA devised a student attachment programme “Nurturing the Young” for students of institutes of higher learning. The students were given an appreciation of UD and barrier-free accessibility concepts before conducting accessibility audits on buildings. Through this, they gained another perspective on the importance of accessibility in the community and how the absence of UD features could affect various users.

Jeanette Yeo, who was from Ngee Ann Polytechnic’s Psychology Studies, realised after her seven-week stint in the “Nurturing the Young” attachment programme that there is a close link between psychology (the subject she was studying) and buildings. When asked by her friends who were puzzled about her industrial attachment to BCA, Jeanette explained with passion and clarity, “The purpose of a building is for human use, and if a building is not designed to meet the needs of the people using it, it would be a waste and the building will not be fulfilling its full purpose. Therefore, a building must be designed to consider the needs, safety, and purpose of the people using it.” Simple yet profound. **BCA**

A CUT ABOVE THE REST

QUALITY – SOMETHING YOU CAN SEE, FEEL AND EXPERIENCE. IT IS BOTH TACTILE AND VISCERAL; AN ATTRIBUTE THAT LETS YOU KNOW PATIENCE AND ATTENTION TO DETAIL HAVE BEEN PAINSTAKINGLY WEAVED INTO OUR LIVING ENVIRONMENT.

CONSTRUCTION QUALITY ASSESSMENT SYSTEM (CONQUAS®)

Introduced in 1989, CONQUAS® assesses the quality of building projects in Singapore by scrutinising random samples taken from various stages of the construction process. The appraisal is based on a combination of visual assessment and measurement tools to verify against current standards.

This has led to the rise in the quality of building developments in Singapore over the past decade, with average CONQUAS® scores rising from 77.8 to 83.4 – underscoring the efforts and improvements by the building and construction industry to raise the quality of our living spaces.

Although CONQUAS® is not a mandatory requirement, developers and builders have committed 93 per cent of private residential and commercial projects in Singapore for the assessment.

The benefits of submitting their projects for CONQUAS® scoring are manifold. Firstly, CONQUAS® provides the industry, especially the builders and subcontractors, a systematic way to measure and achieve a certain level of quality. Secondly, firms can set targets for themselves and even benchmark their performance against the top scorers in the industry. Lastly, rework is reduced as contractors now have to get the formula right from the start.

The CONQUAS® system is not only a national yardstick of workmanship quality for the industry in Singapore, it is also a registered trademark in eight countries overseas. Moreover, the system is sought after internationally as a benchmarking tool for quality in Malaysia and China. Hong Kong SAR, United Kingdom and South Africa have also adopted quality assessment systems based on CONQUAS®. In FY2010, 150 projects underwent CONQUAS® assessment, with a third of them from overseas, mainly Malaysia.

CONQUAS®

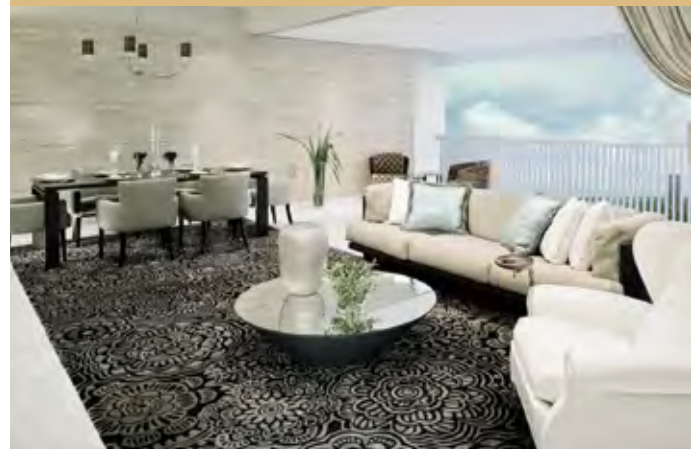
AVERAGE
CONQUAS®
SCORE IN FY2010

83.4

TOP THREE
CONQUAS® SCORES
SINCE 1989

96.3

96.2 | 95.6



THE ARTE, TOP CONQUAS® SCORER (96.2) FOR FY2010



93%

OF PRIVATE RESIDENTIAL
AND COMMERCIAL
PROJECTS ASSESSED
UNDER CONQUAS®

223

 PROJECTS
ASSESSED IN MALAYSIA

OVER **800** (66%)
PROJECTS SCORING
ABOVE 75.0 OVER THE
PAST 10 YEARS

A STANDARD ADOPTED
INTERNATIONALLY
IN **4** COUNTRIES
AND COUNTING

QUALITY MARK (QM)

62.4%

 PRIVATE RESIDENTIAL
BUILDINGS IN SINGAPORE
COMMITTED TO QM IN FY2010

BCA CONSTRUCTION EXCELLENCE AWARD (CEA) 2010

IN
ITS **24TH**
YEAR

158 AWARDS AND
160 CERTIFICATES
OF MERIT WERE
CONFERRED SINCE 1986

31 PROJECTS SHORTLISTED IN
6 CATEGORIES FOR 2010 AWARDS

HITTING THE QUALITY MARK

To push for even higher standards of workmanship in residential developments, BCA introduced the BCA Quality Mark (QM) for Good Workmanship scheme in 2002. This voluntary scheme measures the quality of workmanship in each newly completed residential unit and certifies the condition of the unit at the time of inspection. Homeowners of these certified units are reportedly more satisfied with their purchases which required less rectification work to be done after taking over the units.

BCA will assess all internal finishes like floor, wall and ceiling finishes, architectural components and fittings like doors, windows, wardrobes, kitchen cabinets, vanity tops, shower screens and basins, and even mechanical and electrical fittings such as switches. A water ponding test is also done for bathrooms to check for possible leakages.

Over the last few years, the number of QM units has been steadily increasing, with more than half of the units in private residential developments launched in Singapore last year committing to the scheme. The motivation for builders and developers to volunteer for such a scheme stems from a marketplace that has become much more sophisticated, coupled with rising expectations from consumers. This is a natural response to not only ensure

the marketability of their projects but enhance the confidence of clients and consumers all round.

Since November 2010, developers and builders can look forward to more differentiated recognition under BCA's new tiered rating system for Quality Mark. The three tiers (Star, Excellent and Merit) recognise developers and builders that have achieved quality excellence far above the high standards required in QM residential projects.

This has yielded a collective mindset of progress and commitment to quality among developers and builders in the industry, who are now more willing to challenge themselves to adopt such stringent systems so that they may deliver better quality homes and properties. This has also translated to a higher attendance in CONQUAS® training workshops for those interested in the quality aspects of building developments. There are also certified CONQUAS® and Quality Mark Manager courses offered by the BCA Academy which are suited for those looking to acquire specialised knowledge and experience.

With this growing momentum and the evolving marketability of 'quality' in properties all over Singapore, it only remains to be seen if the BCA Quality Mark will become a tangible and integral value proposition for any property sale. **BCA**

THE RIGHT STAFF

AS WITH THE AMAZING STRUCTURES IN OUR BUILT ENVIRONMENT, BCA BELIEVES IN LAYING THE RIGHT FOUNDATION WITHIN THE ORGANISATION – WITH ITS STAFF.



IN LINE WITH THE BELIEF that BCA staff are the greatest asset in delivering BCA's mission and vision, BCA ensures that it provides a conducive work environment through the Employee Well-Being Model, which includes the Economic, Social and Physical aspects.

A structured Workplace Health & Sports Promotion (WHSP) Programme is also in place to enhance the physical, mental and emotional well-being of our staff, with the aim to build up a healthy, productive and happy workforce. Activities include on-site health screening and mobile health services, healthy food making demonstrations, lifestyle & personal health skills, health & mental well-being talks, physical exercises and other health promotion related activities.

A quality work-life, physical and mental well-being culture will contribute to maximising our staff's performance, and eventually contribute significantly to the development of a best built environment.

01 BCA receiving the Singapore HR Award 2010
| 02 Paintball session for BCA staff



STAFF DEVELOPMENT

Another important aspect of staff development is the Talent Management Programme, which is used to groom promising officers for leadership renewal. These officers undergo leadership development courses and will also be offered various upgrading opportunities including pursuing postgraduate studies. Job rotations continue to be another platform for us to develop these officers for leadership succession. Other opportunities to provide officers with wider exposure include involving them in the Policy Group, Taskforce and also Sparks Project Teams.

In addition, we also attach interested officers to private sector firms as well as relevant public agencies to gain exposure on the industry operations. This enhances the officers' understanding of the industry, which in turn helps them in formulating policies which are practical and cater to the needs of the industry.

CORPORATE SOCIAL RESPONSIBILITY

In July 2010, BCA took home the Singapore HR Award 2010 under the Special Category Award (Leading HR Practices Award - Corporate Social Responsibility) awarded by Singapore Human Resources Institute (SHRI). This award attested to our organisation's commitment and core values of caring for the well-being of its

staff, the community and the environment. BCA had organised more than 10 CSR activities during the year, including the BCA CSR Day.

SERVICE EXCELLENCE

Service excellence is equally important for private sector organisations and public agencies like BCA. It is important that we maintain a consistent level of service across the entire organisation as our customer base gets bigger and more diverse. Service excellence is no longer just confined to our frontline services. Our 'CARE' service promise means that we have to deliver our service by being Competent, Accessible, Responsive and Empathetic. To spur our officers towards this culture, awards are given out to recognise officers for their efforts and dedication in delivering service above and beyond their normal duty. During the year, a total of 20 individual officers and six teams were awarded the BCA Quarterly Service Excellence Award. Another two individuals and two teams, the Zero Energy Building (ZEB) tour guide team and Transit Shelter Engineering Department team, were conferred the BCA Annual Service Excellence Award.

Besides recognition, team building sessions were held to cascade the new customer service promise based on the CARE attributes to all staff. **BCA**



GOING THE EXTRA MILE

Mr. Chua Beng Leong had gone the extra mile in his duties as a training officer at the BCA Academy. Being a dedicated trainer, he has even sacrificed his personal time to give extra lessons to his students. A foreign student was facing the prospect of returning to his home country should he fail a test, and Mr Chua selflessly offered him extra coaching. The student eventually passed the test.



LEARNING FROM OVERSEAS EXPERTS

BCA has recently taken on the regulation of amusement ride safety, with the new legislative framework commencing in July 2011. To ensure BCA has the in-house expertise to handle the new function, besides recruiting from the private sector, conscious efforts are also made to train our existing staff. Mr Joseph Hong from the Building Plan & Policies Department was attached to a UK firm, Jacobs Engineering UK Private Limited for three weeks to allow him to pick up first-hand knowledge on the design and inspection of complex amusement rides.



03 BCA raised \$17,800 for the Singapore Association of the Visually Handicapped

BCA AWARDS 2010

THE BUILDING AND CONSTRUCTION AUTHORITY HANDED OUT A WHOPPING 159 AWARDS AT ITS ANNUAL BCA AWARDS CEREMONY, AN INDICATOR OF THE GROWING COMMITMENT OF SINGAPORE'S CONSTRUCTION INDUSTRY TOWARDS GREATER CONTRIBUTIONS TO THE ECONOMY AND BUILT ENVIRONMENT.





SNAPSHOTS OF THE YEAR



01 Inaugural cohort of the BCA-UCL MSc in Facility and Environment Management | 02 Completion of Estate Upgrading at Hillview Estate | 03 National Productivity and Continuing Education Council studied productivity features at CDL's construction site



04 Singapore's construction demand for 2010 to reach between \$21 billion and \$27 billion | 05 Graduation ceremony at BCA Academy for more than 450 building professionals





06 BCA Academy Open House 2011
 | 07 Built Environment Scholarship,
 Training and Career Fair | 08 ZEB won IES
 Prestigious Engineering Achievement
 Awards 2010 | 09 International experts
 reviewed Singapore's construction
 productivity plans | 10 APEC Ease of Doing
 Business Workshop





MODEL YOUR CAREER BUILD THE FUTURE

BUILT ENVIRONMENT SCHOLARSHIP

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