

# PILLARS |

Building and Construction  Authority

We shape a **safe**, **high quality**, **sustainable** and **friendly** built environment.



\$250 Million  
Productivity  
and Capability  
Boost  
• p2-4

\$15 Million for Sustainable  
Construction • p5

Unlimited by Diversity,  
Unified through Design  
• p8-9

Singapore's Green  
Showcase for China • p14



Mr Edwin Lee is the Senior Project Manager at Tiong Seng Contractors Pte Ltd. He has contributed to the construction of several significant projects including the Capella Hotel Resort at Sentosa and the Home Team Academy, which received BCA's Construction Excellence Award in 2007. His latest project is Resorts World @ Sentosa, one of the two iconic integrated resorts in Singapore.

**Editorial Committee:**

Chief Editor: Jeanna Das  
Editor: Kong Yuqi  
Sub-Editor: Leong Ee Leng

**Contributors for this issue:**

Adeline Loo  
Grace Teo  
Gwen Ho  
Jonathan Cheng  
Kong Yuqi  
Leong-Kok Su Ming  
Ooi Seow Min  
Tan Wee Kwang  
Tham Kai Wai  
Cheng Ming Chin, Temasek Polytechnic  
Edwin Lee, Tiong Seng Contractors Pte Ltd

**Your views and contributions:**

Let us know what you think about Pillars. You are also welcome to contribute an article, subject to our approval. Please attention it to **The Editor, Pillars** if you send by post or fax to the BCA address stated. Alternatively, you can email to [bca\\_enquiry@bca.gov.sg](mailto:bca_enquiry@bca.gov.sg).

Pillars is published bi-monthly by the Communications Department, Building and Construction Authority 5 Maxwell Road #16-00 Tower Block MND Complex Singapore 069110  
Tel: 6325 7720 Fax: 6325 4800  
Email: [bca\\_enquiry@bca.gov.sg](mailto:bca_enquiry@bca.gov.sg)  
Website: <http://www.bca.gov.sg>

Written permission must be obtained from BCA to reproduce any part of Pillars.

Printed on environmentally friendly paper

# PILLARS

## contents

CEO's Message • p1

\$250 Million Productivity and Capability Boost • p2-4

\$15 Million for Sustainable Construction • p5

Samwoh Eco-Green Building • p6

Grooming our Own Facility Management Experts • p7

Unlimited by Diversity

Unified through Design • p8-9

Interview with IPEUD Panel Speakers • p10-11

Green Developments in the Forefront • p12

The Platinum Way to Go Green • p13

Singapore's Green Showcase for China • p14

Young Leaders and Their Contributions:

Building for the Next Generation • p15

From Lecturers to Green Champions • p16

New Civil Defence Shelters in MRT Circle Line • p17

Taking on the Green Challenge • p18-19

Beautified and Accessible MacPherson Gardens • p20

Upcoming Events • p21

# CEO's Message



Dear readers,

Following the Economic Strategies Committee's (ESC) call to boost Singapore's productivity level, BCA has reviewed various policies and will be introducing new measures to raise productivity and capability within the construction sector. These will be complemented through a \$250 million incentive package so companies in the building and construction industry can now tap on this new fund to send their staff for upgrading courses and to invest in technologies to enhance work processes. In addition, we will also be setting up a Construction Productivity Centre to facilitate the industry's adoption of advanced construction technology.

On top of the \$250 million Construction Productivity and Capability Fund, we have also rolled out a \$15 million Sustainable Construction Capability Development Fund to help build up capabilities within the industry for sustainable construction and technologies. Samwoh's Eco-green Building, which was unveiled in March, is one successful example of a sustainable construction project where Recycled Concrete Aggregates were put to effective use in a building's structure. The project is also testament to the critical role of Research and Development in the advancement of sustainable construction. More on the list of incentives available under these funds can be found in this issue.

As Singapore progresses in the greening of our built environment, our local firms are also building up expertise in products and services related to green building technologies and sustainable urban solutions. Recently, BCA and the Singapore Green Building Council (SGBC) led a 50-strong delegation to Beijing to showcase Singapore's green building initiatives and capabilities. The team also took the opportunity to meet up with Chinese developers to discuss future collaborations and business opportunities.

At home, we are continuing with our efforts to promote sustainable living to the industry and the public through seminars and exhibitions, including

the 2nd Green Building Exhibition at Suntec City from 11 to 14 March 2010, which was opened by Mayor Zainudin Nordin. Those who missed the exhibition at Suntec City can join us at the 3rd Green Building Exhibition at HDB Hub this coming July.

To promote the need to embrace the concept of "Design For All" in an inclusive society, BCA held the first International Panel of Experts meeting on Universal Design (IPEUD) in March 2010. The IPEUD sessions involved participation from many other government agencies (such as URA, LTA, HDB, NParks, People's Association, MOE, MCYS), developers, architects, engineers, industry associations, tertiary institutions and voluntary welfare organisations (such as Handicaps Welfare Association, Singapore Action Group of Elders, Disabled People's Association, Society for the Physically Disabled). Although it was just a three-day event including a seminar, we have learnt much from the overseas experts about their experiences and challenges in promoting Universal Design in their home countries. We are studying the recommendations and we hope to implement some feasible ones to make our built environment a friendlier one for all.

Finally, I would like to urge all our partners to join the industry-wide effort in enhancing our productivity and capability in the construction sector, and making use of the Fund to do so over the next 5 years.

Dr John Keung  
Chief Executive Officer



# \$250 Million Productivity and Capability Boost

The construction sector will get a \$250 million incentive package to boost productivity and build capability. This follows the Economic Strategies Committee (ESC)'s recommendation for Singapore to grow deeper capabilities and expertise to make the most of the opportunities ahead. To sustain economic growth, "we have to make a clear shift: to grow based on skills, innovation & productivity."

As the construction sector remains one of the key pillars of Singapore's economy, the Government has provided a \$250 million Construction Productivity and Capability Fund (CPCF) to help industry firms raise the quality of their workforce, lower the cost of adopting advanced construction technologies, and build up their engineering capability to undertake complex projects.



BCA-Industry Built Environment Scholars

## Workforce Development

To raise the quality of the workforce, the Fund will co-fund the cost of skills upgrading and assessment of workers for CoreTrade registration and the course fees of other higher value-adding qualifications at supervisory levels\*. At the PMET levels, the BCA-Industry Built Environment Scholarship has also raised the minimum sponsorship level from \$10,000 to \$14,000 per year for each Singaporean and Singapore Permanent Resident scholar.



Technology Adoption: Use of Integrated System Formwork

## Technology Adoption

Firms can also look forward to financial support when they adopt advanced construction technologies and re-engineer their workflow to improve productivity. BCA will co-fund the purchase and leasing of equipment and support firms that embark on technical reviews, adaptation studies and developmental projects to raise productivity. The industry, particularly the small- and medium-sized firms, should take this opportunity to harness technology for long-term productivity benefits.

To transform the next generation of building design and construction, BCA will also defray part of the cost incurred by firms using Building Information Modeling (BIM) technology to improve their work processes. This will help to improve co-ordination across the construction value chain and reduce re-work downstream.

BCA will also work with the industry to strengthen the existing Buildability Score Framework to require greater adoption of buildable designs and the use of more prefabricated products to ease construction work on site. Going beyond the design stage, BCA will extend this framework to include downstream construction works. Builders will be required to adopt more labour-efficient technologies or construction methods, measured using a set of constructability indices.

\*Applicable only to stipulated courses listed in <http://www.bca.gov.sg>

## Capability Building

Besides technology adoption, the upcoming strong pipeline of complex civil engineering projects and the increasing number of relatively more complex building projects present the industry with great opportunities to build up their engineering capabilities. BCA will introduce a holistic scheme to nurture progressive builders with specialised capabilities to undertake complex construction projects. This scheme will help to partially defray the cost of capability building, such as immersion programmes for staff to gain experience in complex construction works and the engagement of specialist consultants to catalyse knowledge transfer to build up in-house engineering expertise.



*Capability Building: Developing construction engineering expertise in underground MRT projects*

Type of Fund	What is Funded?	How Much is the Funding?	Who is Eligible?
<b>(i) Workforce Development</b>			
Workforce Training and Upgrading	Cost of selected skills assessment and training courses for workers	<ul style="list-style-type: none"> <li>Up to 80% of the course/training/skills assessment fees</li> </ul>	Industry firms
BCA-Industry Built Environment Scholarship	Co-sponsorship of scholarship	<ul style="list-style-type: none"> <li>50% of the annual minimum scholarship sum of \$14,000 for each Singaporean and Singapore Permanent Resident scholar</li> </ul>	Industry firms
<b>(ii) Technology Adoption</b>			
Mechanisation Credit (MechC)	Cost of purchasing or leasing of equipment that improves productivity of the specific work process by at least 20%	<ul style="list-style-type: none"> <li>Up to 50% co-funding for equipment purchase, capped at \$20,000, whichever is lower</li> <li>Up to 50% co-funding for equipment leasing, capped at \$5,000, whichever is lower</li> </ul>	Contractors, specialist contractors and subcontractors
Productivity Enhancement Voucher (PEV)	Cost of engaging Knowledge Institutions (KIs) or external consultants to develop simple and practical ideas that improve productivity of the specific work process by at least 20%	<ul style="list-style-type: none"> <li>Up to 50% co-funding, capped at \$20,000, whichever is lower</li> </ul>	Contractors, specialist contractors and subcontractors
Productivity Improvement Project (PIP)	Cost of undertaking projects which involve the application of technology and re-engineering of work processes to improve productivity by at least 20%	<ul style="list-style-type: none"> <li>Up to 50% co-funding at firm and group level</li> <li>Up to 70% co-funding at industry level</li> </ul>	Contractors and prefabricators
BIM Fund	Cost of adopting BIM technology into work processes	<ul style="list-style-type: none"> <li>Up to 50% co-funding for training and consultancy, capped at \$7,000 per firm</li> <li>Up to 50% co-funding for consultancy and software/hardware for a group of firms working on a project, capped at \$70,000 per project</li> </ul>	Design, consultancy and construction firms

For more information on the incentive schemes under the Construction Productivity and Capability Fund, please visit "Government Assistance" at [www.bca.gov.sg](http://www.bca.gov.sg) or contact CPCF Toll-free hotline 1800-325 5050.

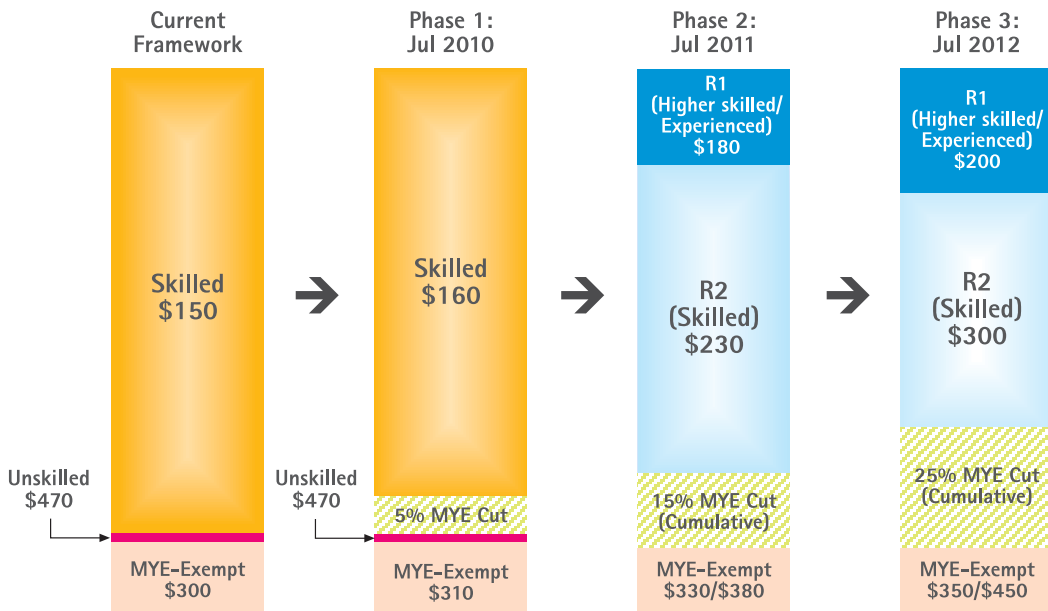
\* Firms applying for the funds above should be registered and operating in Singapore.

### New Construction Productivity Centre

To front the call for higher productivity, BCA is setting up a **Construction Productivity Centre**. The Centre will work closely with the industry to meet the specific needs of construction firms and to introduce suitable advanced construction technology to help firms achieve higher productivity.

Through the Construction Productivity Centre and with support from the \$250 million Construction Productivity and Capability Fund, BCA will work with the stakeholders to transform the construction industry into one that is productive, resilient and technologically advanced.

## Changes to the Man-Year Entitlements and Levy Framework



*\*The diagram above is only indicative and not drawn to scale.*

The changes to the Man-Year Entitlements (MYE) and levy framework have been introduced to achieve two objectives. Firstly, through MYE cuts and levy increases, the industry can be steered towards greater technology adoption and optimisation of labour usage. Secondly, it is to encourage the industry to upgrade and retain their better and more experienced workers.

To meet the second objective, the new tiered levy framework will use levy differentials to distinguish the experienced and skilled foreign workers – armed with CoreTrade or other specialised qualifications – from the newer entrants with basic skills.

The Government is mindful of the impact of these policy changes to the industry. The changes will thus be progressively introduced over three phases to give the industry adequate time to adopt technology and adjust their labour deployment. In particular, the levy increase in the first phase, in July 2010, will be kept to a minimum level of \$10 to minimise the cost impact on existing projects.

# \$15 Million for Sustainable Construction

The new \$15 million Sustainable Construction Capability Development Fund will build up the capabilities of industry players in adopting sustainable construction practices and technologies. In doing so, the industry will be more self-sustaining in the demand and supply of sustainable construction materials. The new fund was announced by Ms Grace Fu, Senior Minister of State for National Development and Education, at the official opening of Samwoh Corporation's Eco-Green Park on 22 March.

To encourage a greater adoption of sustainable construction materials within the construction industry, industry players can now tap on the new fund to invest in extensive test-bedding of sustainable construction technologies, materials and technical know-how, which they can integrate into their processes and business operations. Demolition contractors, construction waste recyclers and ready-mix concrete manufacturers can also apply for funding support to invest in technology and enhance the quality of the recycled products.



*Purchase of equipment such as remote-controlled demolition equipment to facilitate improved resource recovery. (Photo credit: Brokk)*

To further ensure the reliability and quality of the recycled materials, all ready-mix concrete manufacturers supplying concrete for structural use in Singapore will also be required to be certified based on standards identified by BCA and the Singapore Accreditation Council from October this year.

## Upcycling construction waste

Although about 98% of construction and demolition waste is recycled within the construction industry each year, the recycled materials have been generally used for low-value applications such as fill material for construction sites or for the construction of temporary access ways at sites. With this Fund, BCA aims to upcycle the use of the demolition waste by using the recycled concrete aggregates processed from this waste to partially replace natural aggregates in the manufacturing of concrete for structural application.



*Test-bedding to study feasibility of alternative materials such as using soil hardeners or precast slabs to construct temporary roads.*

To further underscore the importance of sustainable construction, BCA plans to revise the Green Mark assessment criteria later this year. Developments aiming for the higher Gold<sup>plus</sup> and Platinum awards will be required to achieve a higher level of efficiency in the use of natural materials or to use recycled materials such as recycled concrete aggregates.

In the long run, the successful adoption of sustainable construction will not only mitigate the industry's impact to the environment but will also reduce its dependency on imported natural aggregates.

**For more information on the Sustainable Construction Capability Development Fund, please log on to BCA's website [www.bca.gov.sg/CPCF/cpcf.html](http://www.bca.gov.sg/CPCF/cpcf.html).**



# Samwoh Eco-Green Building



*The Samwoh Eco-Green Building (Photo credit: Samwoh Corporation)*

When it was unveiled on 22 March, the Samwoh Eco-Green Building was the first building in Singapore – and possibly one of the first few in the world – to use concrete made with 100% recycled concrete aggregates for the top level.

In addition, the first and second levels were constructed with concrete using 30% and 50% recycled concrete aggregates respectively. Another unique feature of the building was the use of fibre-optic sensors embedded in the columns to monitor the long-term structural performance of the concrete. The results obtained from the study will be useful for in-depth structural analysis and the formulation of future specifications on the use of recycled concrete aggregates for structural concrete.

The Eco-Green Building was the result of a joint project between Samwoh Corporation, BCA and Nanyang Technological University to conduct a full-scale evaluation on the use of various percentages of recycled concrete aggregate in structural concrete for building structures. The project, which began two years ago, was one of 11 sustainable construction related projects funded by the MND Research Fund for the Built Environment.



*The Samwoh Ready-Mixed Concrete Plant*

The Eco-Green Building is one of three premises sited at the Eco-Green Park. The second premise, the Asphalt Recycling Plant, employs state-of-the-art technology to recycle asphalt pavement waste into asphalt mixtures for road construction. The recycling of the asphalt pavement waste will help to alleviate waste disposal problems as well as reduce the demand of natural aggregates and bitumen needed for the construction industry. The third building, the Ready-Mixed Concrete Plant, is also equipped with recycling facilities which will produce eco-concrete with the recycled materials.

The successful completion of the Eco-Green Building not only proves the viability of using recycled concrete aggregate for structural works. It also signifies a breakthrough in the research and development of sustainable materials for the industry. Samwoh's success in this sustainable construction journey will pave the way for greater sustainability and environmental consciousness and increase the confidence of developers, consultants and construction companies in adopting recycled materials for future construction projects.



# Grooming our Own Facility Management Experts

The industry will soon have a new batch of facility management experts with the introduction of a new Master of Science in Facility and Environment Management programme. This new postgraduate programme is made possible through a partnership BCA sealed with University College London (UCL) on 9 March 2010.

It will be the first Master programme that UCL is conducting outside London. The course will be taught by leading experts from the UCL's Bartlett Faculty at BCA Academy. To underline the strategic importance of developing expertise in facility management, local professionals who are given a place in this programme will enjoy a 60% tuition subsidy. The first cohort of students will start their learning journey in September 2010.

The two-year part-time programme is tailored specifically for students in Singapore, especially for professionals with work experience in facility management and building-related disciplines. It will adopt a blended learning approach, combining traditional face-to-face teaching by visiting UCL lecturers and distance learning using one-to-one Skype tutorials, podcasts and video seminars. The inclusion of industry site visits will further provide students

with practical insights into facility management issues first-hand.

This programme will build up a pool of facility management experts to help the industry achieve its target of retrofitting 80% of existing buildings to Green Mark standards by 2030, as outlined under BCA's second Green Building Masterplan. As well-trained professionals, the graduates will be armed with the technical skills and knowledge to manage and operate the technologies and other features found in green buildings.

The BCA Academy also offers a comprehensive range of other training programmes for school leavers and practising facilities management professionals. These programmes include the Bachelor of Science in Facilities and Events Management, the Diploma in Strategic Facilities Management, the Specialist Diploma in Facility and Energy Management, and the Certified Green Mark Facilities Manager Course.

For more information on the Master of Science in Facility and Environment Management Programme, please log on to [www.bcaa.edu.sg /MScFEM.aspx](http://www.bcaa.edu.sg/MScFEM.aspx).

## Forging the Partnership



*Signing of Memorandum of Understanding with UCL*



*From left: Mr Benedict Tan, Managing Director, BCA Academy; Mr Peter McLennan, Course Director, MSc in Facility and Environment Management, UCL; Professor Alexi Marmot, Head, Bartlett School of Graduate Studies, UCL; Mr Quek See Tiat, Chairman, BCA; Dr John Keung, CEO, BCA*

About 120 guests and potential students attended the programme preview and witnessed the signing of the collaboration agreement for the Master of Science in Facility and Environment Management programme.

Commenting on the agreement, BCA Academy's Managing Director, Mr Benedict Tan said: "We are honoured to work with UCL, a world renowned university, to bring the MSc Programme in Facility and Environment Management to Singapore. This UCL Master's Programme will enable us to train a new generation of high-calibre and innovative facility managers, with the knowledge and skills to provide leadership and sound advice on the development, management and operation of 'green' buildings".

Mr Tan added that the graduates of the programme would have a key role to play in helping to reduce the carbon footprint of our built environment and contribute to the national effort to make Singapore a greener and sustainable global city.

The event, which took place at the National Library Building, also saw Professor Alexi Marmot, Head of Bartlett School of Graduate Studies, delivering a lecture titled 'Sustainable Facilities-Managing the Future'.

# Unlimited by Diversity Unified through Design

*Design should meet the needs of all users with varying ages, sizes and abilities for greater social inclusion. It is not about discreet subsets but about people and the inherent diversity among us.*

The objective of design in embracing diversity was reaffirmed recently at the BCA International Panel of Experts meeting on Universal Design.

The panel – comprising international leading experts in Universal Design – convened its first meeting in Singapore at BCA Academy from 22 to 24 March 2010. The meeting was co-chaired by BCA's CEO, Dr John Keung and BCA board member, Mr Richard Hassell. The overseas panel members included Mr Francesc Aragall (Spain), Professor Keith Bright (United Kingdom), Ms Valerie Fletcher (United States) and Dr Satoshi Kose (Japan), while local panel members included Mr Michael Ng, Ms Rita Soh and Professor Wong Yunn Chii.

Over the three days, the panel engaged in rigorous discussions and networking with key representatives from BCA as well as the academia, the public, the private and the people sectors. The objective was to review the various initiatives under the BCA's Accessibility Masterplan to drive the adoption of Universal Design in Singapore.



*Participants at the IPE meeting on Universal Design*



*Two sets of handrails at different heights for people of different statures at Sengkang Aspella, UD Award Bronze winner 2009*

The programme also allowed the panel members and participants to visit local sites to appreciate real-life applications and benefits of Universal Design. In particular, they visited Anchorvale Community Club, Sengkang Sports and Recreation Centre and two public housing estates – the refurbished Clementi Green and the recently completed Sengkang Aspella. Impressed with the attention put into ensuring seamless inter-connectivity, the members highly commended the efforts made towards enhancing user-friendliness and accessibility.

The panel meeting served as a synergistic platform to review the current challenges faced and strategies undertaken as well as to seek expert advice on the way forward. It was also an opportunity to engage and inspire the industry through the experts' sharing of their global experiences and practices.

During the meeting, panel members and participants engaged in constructive discourse, contributing fresh perspectives and valuable inputs towards advancing the Universal Design cause in the built environment. The panel also commended the approach and efforts Singapore had taken in improving accessibility in the built environment and driving the adoption of Universal Design.

The fruitful meeting concluded with a set of key recommendations and directions that BCA will be reviewing in consultation with industry stakeholders and public users.



*IPE members with BCA management at BCA Academy's Sensory Garden*

*From left: **Dr Satoshi Kose**, Professor, Shizuoka University; **Ms Valerie Fletcher**, Executive Director, Institute of Human Centered Design; **Ms Goh Siam Imm**, Deputy Director (Building Plan & Management), BCA; **Prof Wong Yunn Chii**, Head (Dept of Architecture), National University of Singapore; **Mr Michael Ngu**, CEO, Architects61 Pte Ltd; **Prof Keith Bright**, Emeritus Professor of Inclusive Environments, University of Reading, (also Director, Keith Bright Consultants); **Mr Francesc Aragall**, President, Design for All Foundation (also General Director, ProAsolutions); **Dr John Keung**, CEO, BCA; **Mr Richard Hassell**, Board Member, BCA (also Director, WOHA); **Ms Rita Soh**, President, Board of Architects (also Director, RDC Architects Pte Ltd); **Mr Ong See Ho**, Deputy CEO (Building Control), BCA; **Mr Chin Chi Leong**, Director (Building Plan & Management), BCA*



*Barrier-free access into pools at Sengkang Sports & Recreation Centre, UD Award Gold winner 2009*

### Reaching out to the Public

The International Panel of Experts also took part in a public seminar, attracting a healthy turnout of more than 300 participants. The seminar commenced with Mr Quek See Tiat, BCA Chairman, whose opening address covered the need for a shift in mindset as well as building relevant capabilities of various stakeholders.

The four overseas panel members then described the concept of Universal Design and its value to the community and also provided the audience with insights of best practices globally. Closer to home, past winners of BCA's Universal Design Award - Anchorvale Community Club and Sengkang Sports and Recreation Centre and Alexandra Hospital - shared their strategies on enhancing user-friendliness in the facilities.



# Interview with IPEUD Panel Speakers

How is Universal Design beneficial to both developers and users and why should it be adopted in building designs? We got four speakers, Dr Kose, Professor Bright, Mr Aragall and Ms Fletcher, from the International Panel of Experts on Universal Design (IPEUD) to share their views.

## 1. Can you share some of the best practices in your country which Singapore can learn from?

**Mr Aragall:** Singapore is already among the leading countries in the field. In 1991, we passed legislation to adopt the concept of Design for All (Universal Design) in all aspects of the built environment. This includes urban spaces, new and existing buildings, transport, products and services and accessibility management. For instance, all elevators should have an avenue to allow a deaf person to communicate in times of emergency, normally via SMS.

**Dr Kose:** There was a requirement to incorporate senior friendliness in dwelling designs due to the drastic change of mortgage scheme by the Japan Housing Loan Corporation in 1996. To be eligible for lower interest rate and larger sum of mortgages, there was a need to incorporate energy efficiency or senior friendly design into the buildings. Most housing manufacturers (both detached houses and multifamily housing) changed their design standards to meet the new requirements.

However, due to the previous level of standard designs, the Housing Loan Corporation faced a great challenge, which was to compromise the designs, from desirable to attainable. So unfortunately, the situation still persists. The Corporation is now defunct, and we would need another strategy to further upgrade housing designs for accessibility and usability.

## 2. There is a perception that adopting Universal Design may not be cost-effective. Does it make economic sense for building owners to adopt Universal Design?

**Professor Bright:** Universal Design is about much more than designing for disabled people. It is about designing and managing places and spaces in ways that will cater for the diversities amongst user groups. For example, a door width does not only need to be suitable for a wheelchair user – it needs to be wide enough for all of us to use. That includes parents with strollers, people with luggage, shopping bags or guide dogs.

When Universal Design is not adopted from the beginning, it can lead to additional cost when rectification is needed, for instance, when a ramp needs to be built in place of stairs. For Singapore as a tourist destination, visitors would bring with them expectations from their experiences in other countries, so the question to be considered should not be "What is the cost of adopting Universal Design?" but more "What is the cost to your commercial organisation or housing development, or to the economy of Singapore, of not doing so?"

**Ms Fletcher:** Naturally, it is most efficient and cost-neutral if Universal Design is incorporated from the initial stage. There can be costs related to the additional time taken to research and conduct trial-and-error modeling to ensure that the final product will deliver the desired results for the client and the designer.

Once the knowledge of elements, materials and products are integrated into the firm's repertoire, the more cost-effective it becomes to integrate Universal Design. The economic case varies based on building type. Consider the diversity of work itself and design for it to offer spaces for concentration, collaboration and contemplation. Add in a significant attention to ergonomics and seamless navigation and you have a workplace design where improved performance and satisfaction delivers a Return On Investment very quickly.





**Dr Satoshi Kose (Japan)**  
Professor, Department of Architecture, Faculty of Design, Shizuoka University of Art and Culture



**Professor Keith Bright (UK)**  
Emeritus Professor of Inclusive Environments, University of Reading & Director of Keith Bright Consultants



**Mr Francesc Aragall (Spain)**  
President of the Design for All Foundation, General Director of ProAsolutions



**Ms Valerie Fletcher (USA)**  
Executive Director, Institute for Human Centered Design

### 3. What was your greatest challenge when pursuing Universal Design for existing buildings? How did you overcome it?

**Dr Kose:** We are not yet successful in renovating existing buildings to be more accessible and usable. The major obstacle is that our Building Standard Law that relates with building permit requires all current mandatory levels be met when major renovation is done: structural safety, fire safety, environmental control, as well as accessibility.

The most difficult issue is the structural safety regulation that was revised in 1981, which proved to be reasonable against Great Hanshin Earthquake in 1995. However, the outcome is that only if the original design and construction is spacious and sound enough, then can the (accessibility) renovation be done feasibly.

Otherwise, it would be more reasonable to demolish the existing building to be replaced with a new one: scrap-and-build, so to say.

**Ms Fletcher:** We have an Act that requires public accommodations to provide goods and services to people with disabilities on an equal basis with the rest of the general public. The goal is to provide every individual with the opportunity to benefit from our country's businesses and services, and vice versa.

The regulations require architectural and communication barriers that are structural to be removed in public areas if the removal is readily achievable, ie. without much difficulty or expense. However, the regulations do not define exactly how much effort and expense are required for a facility to meet its obligation. So this judgment must be made on a case-by-case basis.

The challenges exist in not having adequate dimensions to renovate for accessibility and the cost incurred from renovation. The worst scenario is the grudging compliance because of a legal obligation – the 'just tell me what I have to do' scenario. Renovation for accessibility without thinking about it and understanding the broad and potentially beneficial impact of the changes can result in costly renovation without really improving the usability of the place.

### 4. What was your greatest motivation behind wanting to create a barrier-free and friendlier built environment?

**Mr Aragall:** My initial motivation came from my profession as an ergonomist, while working in Barcelona for the improvement of the city for the Olympic and Paralympic Games in 1992. I realised that accessibility not only increases the quality of life for the citizens but also the attractiveness of the city.

Along the way, I experienced personally or with friends and relatives that, when having any kind of activity limitation, it would be very helpful and convenient to be able to live in an accessible environment.

**Professor Bright:** My greatest motivation in promoting inclusivity and access is a desire to maximise the opportunities available to people to participate in and contribute to a society according to their individual abilities, and not to have those opportunities restricted by poor design, inappropriate management, prejudice or simple ineptitude on the part of those who create and maintain the environments and spaces we use.

I simply believe that we should become much more aware of the universal needs of everyone when using the built environments we create, and how they can all do so effectively, safely, with dignity and, wherever possible, independently.

Every one of us involved in the creation and management of the built environment has a duty to ensure that all possible obstacles are eliminated, and especially so if doing so incurs no additional cost, just good design and management. Who knows? One day, we may be the person who is affected!

# Green Developments in the Forefront

Once again, the annual Green Building Seminar worked towards advancing Singapore's efforts in promoting sustainable development in the built environment. The Seminar was launched as a collaboration between BCA and the Real Estate Developers Association (REDAS) in 2009. This year, BCA and REDAS welcomed a new partner, the Singapore Green Building Council (SBGC).

Held on 17 March at the BCA Academy, the BCA-REDAS-SBGC Green Building Seminar 2010 received more than 300 participants and provided a platform for active and effective industry discourse, to help foster closer ties between the government and industry.

The seminar explored recent advancements and initiatives in green building developments as well as energy efficient strategies across the life-cycle of buildings. The speakers of the seminar were Mr Lee Chuan Seng, President of Singapore Green Building Council; Mr Silas Loh, Partner of Rider Levett Bucknall; Mr Russell Cole, Director of ARUP Singapore, and Mr Yong Ping Quen, Associate Director from Building System & Diagnosis.

During the seminar, BCA also launched The Green Building Platinum Series of Guidebooks. The guidebooks are designed to provide useful information on best practices in the green building industry.



*Mr Lee Chuan Seng delivering a paper on 'Green Building Recent Developments/SGBC's Roadmap'*



*Mr Silas Loh sharing the powers of an analytical tool - Relifing® in his paper on 'Relifing® of Existing Buildings - Rethinking an Alternative Approach to Building Sustainability'*



*Mr Russell Cole sharing with the audience, the issues owners face when deciding on the appropriate approach for maintenance, repair or upgrading of their existing properties in his paper on 'Retrofitting Buildings for a Sustainable Future'*



*Mr Yong Ping Quen sharing his experiences gained in implementing the integrated green building process for Green Mark Platinum projects in his paper on 'Integrated Green Building Design to Achieve Sustainable Development'*



*Participants listening intently to valuable insights shared by the speakers*

# The Platinum Way to Go Green

The construction industry can now refer to the new Green Building Platinum Series of Guidebooks as it moves towards the target set by the Inter-Ministerial Committee on Sustainable Development (IMCSD) to have 80% of the buildings in Singapore attain at least Green Mark Certified rating by 2030. The guidebooks cover various aspects and attributes of green buildings, ranging from sustainable building designs and strategies to the latest green building technologies.

The Green Building Platinum Series was the result of a collaborative effort between BCA and the industry to consolidate best practices that had been introduced since the inception of the BCA Green Mark scheme in 2005. It was developed to inform and guide owners, architects and consultants to take an integrative approach when designing a high-performance building.



The first in the series, 'Existing Building Retrofit', guides existing building owners through a simple six-step 'green' approach when retrofitting existing buildings, from building evaluation and target-setting to the selection of suitable retrofitting initiatives and final implementation. The second guidebook, 'Building Planning and Massing', focuses on the importance of integrated and passive design as well as the adoption of energy-efficient strategies early in the design stage.

The Green Building Platinum Series of Guidebooks was unveiled by BCA CEO, Dr John Keung at this year's BCA-REDAS-SGBC Green Building Seminar on 17 March 2010. Through its introduction, BCA hopes to inspire industry stakeholders to make a concerted effort to improve the performance of our buildings, to ensure a better built environment for our future.



*Dr John Keung speaking at the BCA-REDAS-SGBC Green Building Seminar*

The first two copies of the Green Building Platinum Series can be downloaded at BCA's website <http://www.bca.gov.sg/Publications/publications.html>. Alternatively, the hardcopies can be purchased at the cashier's office at BCA Academy.



# Singapore's Green Showcase for China

*BCA and the Singapore Green Building Council (SGBC) led a delegation to China to attend the Sixth International Conference on Intelligent, Green and Energy-Efficient Building & New Technologies and Products Expo in Beijing. The aim was to showcase Singapore's green building capabilities and to allow members of the delegation to explore business opportunities.*



Vice-Minister Qiu Baoxing viewing the ZEB model at the Exhibition



Visitors at the bustling Singapore Green Pavilion



Delegation meeting with Sino Singapore Eco High Tech Island Development Co. Ltd., a joint venture company owned by Singapore and Chinese investors

*A schematic of the green pavilion design by Pico Art*



The event, held from 29 to 31 March, attracted close to six thousand professionals, including government officials, developers and consultants from around the world. The 50-strong delegation from Singapore comprised sixteen organisations providing products and services related to green building technologies and sustainable urban solutions.

At the conference, the SGBC's President, Mr Lee Chuan Seng, spoke at the plenary session, while five Singapore experts presented papers ranging from green districts to green building design.

"There is a huge overseas market that local firms can tap on to," said Mr Lee, commenting on how China currently accounts for nearly half of all construction globally. With the Chinese government's strong emphasis on green building throughout major urban areas in China, the market is expected to be worth \$55 billion by 2012.

He added: "But more importantly, we hope such increased interaction will help bring about greater synergy in the global green building market, with more Singaporean firms taking a share of the pie."

At the exhibition component of the event, Singapore's first overseas green pavilion made its debut under the theme 'Greening Singapore – Beyond Garden City'. This pavilion was set up by the SGBC, with the support of BCA and IE Singapore, to showcase government initiatives, company capabilities and to highlight the strong public-private synergy.

"Singapore has a good reputation as a 'Garden City' transforming into a city that is also more environmentally sustainable," said Mr Choo Whatt Bin, BCA's Executive Director for Services. "We hope to ride on that reputation and our experiences in the journey of going green."

Besides attending the conference and exhibition, BCA also arranged for the Singapore-based firms to meet up with Chinese developers to explore opportunities for future collaborations. Following the Beijing event, several firms continued with a mission trip to Shanghai to meet Shimao Property Holdings, and to Nanjing where they met the developers of the Nanjing Eco High-Tech Island.



From left: **Mr Tan Kiat Leong**, Executive Director, Beca Carter (SEA); **Dr. Uma Maheswaran**, Vice President, Sustainable Development, Jurong Consultants; **Dr Lee Siew Eang**, Head, Energy Sustainability Unit, NUS; **Mr Koh Lin Ji**, Acting Director, International Development, BCA; **Er Lee Chuan Seng**, President, SGBC; **Dr Qiu Baoxing**, Vice-Minister, Ministry of Housing and Urban-Rural Development, PRC; **Mr Choo Whatt Bin**, Executive Director, Services, BCA; **Ms Tan Peipei**, China Country Director, Asia Pacific Dept, BCA; **Mr Justin Chew**, General Manager, SGBC; **Ms Ho Quan Yi, Gwen**, China Country Director, Asia Pacific Dept, BCA; **Dr Phang SK**, Director, Phang & Co Solicitors and Associates; **Mr Jeffery Neng**, Deputy Director, Green Mark Department (New Development), BCA; **Dr Gao Chun Ping**, Senior Executive Development Officer, Green Mark Department (New Development), BCA; **Mr Li Xun**, Secretary-General, Chinese Society for Urban Studies, PRC





**Mr Edwin Lee**  
Senior Project Manager  
Tiong Seng Contractors Pte Ltd

## Young Leaders and Their Contributions: Building for the Next Generation

Edwin Lee was just a young and fresh Civil Engineering graduate from Nanyang Technological University when he joined Tiong Seng Contractors in 2003. But he was quickly inspired by the company's strong culture of fostering teamwork, challenging the status quo, adopting creativity and innovation and seeking continuous improvement.

As a professional builder, Tiong Seng Contractors strongly believes that it not only holds a contractual responsibility towards its clients but it also has a social responsibility towards the public. Sharing this conviction, Edwin spares no effort to inculcate the need for responsible behaviour on site by encouraging staff to reduce the unnecessary use of energy and water, and to reduce noise pollution in their daily course of work.

More recently, Edwin was given the opportunity to be trained in Germany on the application of integrated formwork systems. Benefitting from the course, Edwin went on to apply his skills and know-how in his projects to help enhance work productivity. He later shared these experiences with fellow practitioners within the industry.

At Tiong Seng Contractors, Edwin has contributed to the construction of the Home Team Academy and the Capella Hotel Resort Development at Sentosa. He was also part of the team responsible for over 300,000 square metres of construction area at Resorts World @ Sentosa, under a joint venture between Kajima Overseas Asia and Tiong Seng Contractors. As the project manager, Edwin saw to the effective application of advanced formwork systems to help boost productivity on site. As a result, labour requirement was reduced by 30%, as compared to the use of conventional formwork systems.



*Resorts World @ Sentosa*



*Capella Hotel Resort Development,  
Sentosa*

Although the construction industry in Singapore is relatively small compared to other countries, Edwin is confident of the prospects within the industry. He is also looking forward to be part of the industry's talent recruitment programmes in time to come.

Edwin's passion in creating an excellent built environment is further ignited as he anticipates the arrival of his first child. After all, he is contributing to the built environment that his child will grow up in. For Edwin, a job within the building industry is akin to fatherhood where new joys and challenges are discovered each day. With the continuous support of his family, peers and mentors, he is determined to make full use of every opportunity to live out his passion within the industry, while building a safe and high quality environment for his child.

The Built Environment Young Leaders Programme (YLP) is BCA's latest initiative to nurture young professionals with the dedication, passion and leadership qualities to lead the construction sector in the near future. Launched in 2009, this programme aims to proactively engage these capable professionals within the industry by giving them a greater stake in the advancement of the industry. In addition, the YLP will facilitate their training and upgrading progression so that they can constantly enhance their competency and enjoy greater job satisfaction.

# From Lecturers to Green Champions



Lecturers Mr Adrian Ang and Ms Ang-Boey Lai Yin working with student Ler Han Qiang from the Diploma in Green Building & Sustainability. Both lecturers have been trained under the BCA's Green Mark Manager Programme.

On 19 February, Temasek Polytechnic signed a Memorandum of Understanding with BCA, opening windows of opportunities for its lecturers to be involved as co-assessors under the BCA Green Mark scheme.

Under this partnership, selected lecturers from its Diploma in Green Building & Sustainability and the Diploma in Integrated Facility Management will undergo a series of training to be certified as Green Mark Managers.

Mr Chan Kim Kai, Course Manager of the Diploma in Green Building & Sustainability, is confident that the partnership will allow lecturers to stay current with trends in the industry and gain valuable experiences which they can bring back to the classrooms. Students will ultimately benefit from this exchange when their lecturers impart these nuggets of wisdom to them.

Agreeing with him, Ms Ang-Boey Lai Yin, one of the 11 lecturers involved in co-assessments with BCA, says: "We can now be involved in the national movement towards achieving green and energy efficient buildings. This will provide us with invaluable knowledge and experiences, which we can in turn impart to our students. I am looking forward to supervising green-related investigative projects in the near future."

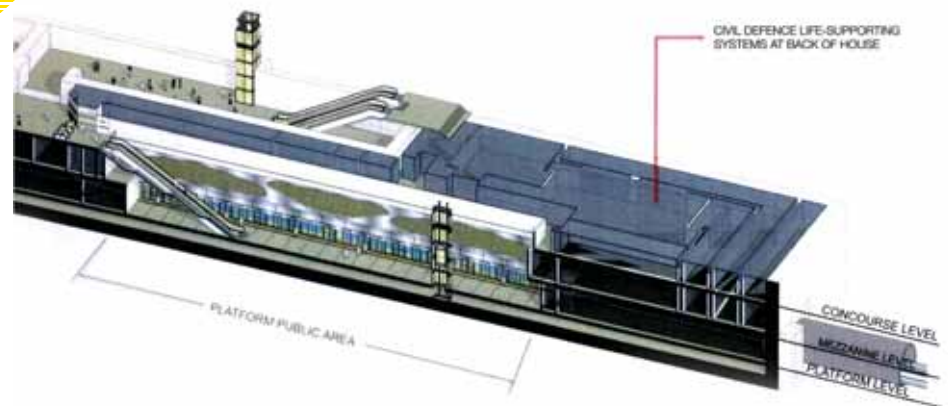
Another lecturer, Mr Adrian Ang, adds that the collaboration with BCA gives him a more in-depth understanding of green issues. He too is excited about how this initiative will open up new avenues for further collaborations with companies in the green building industry.

Students learning under the two lecturers are equally enthusiastic about their involvement. Ler Han Qiang, a final-year student shared: "I ran a number of energy simulations during this period and the experience gained will certainly help enhance my employability when I complete my diploma programme."

From this exciting beginning, Temasek Polytechnic looks forward to having more areas of collaboration with BCA in helping Singapore achieve its target of greening 80% of its buildings by the year 2030.

Contributed by:  
Mr Cheng Ming Chin, Lecturer  
Diploma in Green Building & Sustainability  
Diploma in Integrated Facility Management

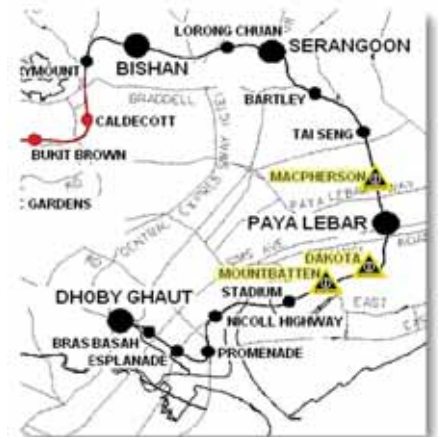
# New Civil Defence Shelters in MRT Circle Line



Besides facilitating transportation, stations along the MRT Circle Line will serve as civil defence shelters, also known as transit shelters, in times of war.

The much awaited second phase of the Circle Line, from Dhoby Ghaut to Bartley, opened for passenger service on 17 April. Three newly-operated stations – Mountbatten, Dakota and MacPherson – in addition to Bartley, Lorong Chuan and Bishan stations which were opened in the first phase last year, are among the largest Civil Defence (CD) shelters in Singapore, capable of protecting thousands of people in the vicinity during wartime.

Transit shelters, by virtue of their built-in CD sheltering capabilities, are more complex than ordinary MRT stations. Apart from being equipped with significantly strengthened station hull and specialised CD equipment – such as blast doors and blast valves to withstand blast pressures – each underground shelter is also fitted with mechanical and electrical life-supporting systems to enable it to operate independently with its own power supply, water supply, filtration and air-conditioning .



3 Transit Shelters in Phase 2 of Circle Line



Testing and commissioning of Transit Shelter blast door by BCA

Prior to the successful opening of transit shelters in this second phase, BCA officers from the Transit Shelter Engineering Department had regulated and provided specialist advice on the entire project development cycle of these shelters in close collaboration with LTA and its appointed consultants and contractors .

The regulation and inspections of these shelters do not end with the opening of the MRT line. After the stations are opened for public use, BCA, the Singapore Civil Defence Force and the MRT operators will continue to inspect and test the CD shelters in the early morning hours when the trains are not running. These inspections are critical in ensuring that the transit shelters remain operationally ready in years to come.



# Taking on the Green Challenge

BCA held the 2nd Green Building Exhibition at Suntec City from 11 to 14 March 2010. Let's take a look at some of the fun happenings at the event!



Mr Nordin (centre left), Mayor of the Central Singapore District, and Dr Keung (centre right), CEO of BCA, giving their thumbs up for a greener future after launching the exhibition! Joining them for the first time in public are BCA's lovable mascots Greco (left) and Beco (right).



Mr Nordin gets a 'feel' of the energy-saving features used in a green home.



## The Green Building Challenge Begins....

One of the highlights of the Green Building Exhibition is the "Green Building Challenge", an "Amazing Race"-style competition for Junior College and Millennia Institute students. Each participating team is given clues to help them identify green buildings and features around the island.

Mr Neo Choon Keong, Director of Manpower & Strategic Policy, BCA, sounds the horn to start-off the race.

Mr Lee Chuan Seng, President of the Singapore Green Building Council, presents awards to the winning teams.



Dunman High School (champion)



Dunman High School (second place)



Raffles Institution (Junior College) (third place)



NUS High School of Math and Science (fourth place)







### What the participants say:

"It sure was physically demanding. But we had fun too! I think it was an innovative approach to learn more about green buildings. I will encourage my juniors in school to join next year!"  
 – *Zi Xuan, Dunman High School*

"I will view buildings with a different perspective now... I used to judge a building based on its design but now, I can better appreciate a building's green features."  
 – *Eng Han, Raffles Institution (Junior College)*

Add us on Facebook by becoming a fan of "BCA Green Buildings".

Go to <http://www.facebook.com/bcagreen>  
 to connect with more than a thousand green building fans today!



## Meet Greco and Beco!

Join us as we uncover some fun facts  
 about BCA's adorable mascots!



### What's in the name?

The names – Greco and Beco – are derived from the letters "G" and "B", which are the initials of the words "Green Building". "Eco" comes from the word "Ecosystem", which is the interaction of an ecological community together with its environment.

### Why Greco and Beco?

Greco and Beco appeal to both children and adults! With these lovable mascots, information on green buildings and green features can now be communicated in fun and interactive ways – from print to online and other media platforms!

### Greco's Biodata

Greco is highly dedicated to the green building movement. She believes she is the greenest office building in Singapore (in fact, she is)! She has a straightforward, serious attitude about green buildings and will go all out to convey the message of green building to everyone she sees. Greco also prides herself on being a Green Mark Platinum building, and will do everything she must in order to keep that image intact.

Name: Greco

Gender: Female

Best Friend: Beco

Favourite Colours: Green and White

Favourite Drink: Rain

Favourite Features: Roof garden, sun-shading and north/south facing facades

Favourite Phrase: "Green office buildings are way cool!"

Pet Peeves: Heat gain in buildings, leaving lights turned on in an empty room and the lack of greenery in buildings!

### Beco's Biodata

The naturally sociable personality of Beco is a big plus in drawing us into living in green homes. Always the fun-loving chap, Beco makes us feel at ease and encourages us to get involved in a variety of activities to turn our home green.

Name: Beco

Gender: Male

Best Friend: Greco

Favourite Colours: Green and orange

Favourite Drink: Recycled water

Favourite Features: Water-efficient fittings, energy-efficient products and natural ventilation

Favorite phrase: "Make your house a green home!"

Pet peeves: Poor home ventilation, energy-zapping air-con systems and failure to maximise daylight indoors

**Do join us at the next Green Building Exhibition at HDB Hub from 1 to 3 July for more fun and action!**

# Beautified and Accessible MacPherson Gardens



*Dr Fatimah Lateef with residents of MacPherson Gardens at the EUP Completion Ceremony*

Barrier-free and Universal Design features have now improved the quality of life for residents at the MacPherson Gardens Estate.

At this private estate, flattened road kerbs and covered drains provide more usable space and seamless connection for residents and wheelchair users. While the construction of gentle slopes and ramps mitigate changes in heights, brightly coloured tactile markings at the footpaths highlight changes in levels and direction.

The estate has further adopted Universal Design features such as having benches equipped with arm-rests at regular intervals, rain shelters at intermediate common areas and slip-resistance floor finishes on footpaths.

These improvements were part of the Estate Upgrading Programme completed in March 2010. In fact, MacPherson Gardens Estate was the first estate to be designed with such extensive barrier-free and universal design features under the programme.

The completion ceremony for this upgrading project took place on 21 March and was officiated by Dr Fatimah Lateef, Member of Parliament for Marine Parade GRC and Adviser to Marine Parade GRC Grassroots Organisations.

## MacPherson roadside

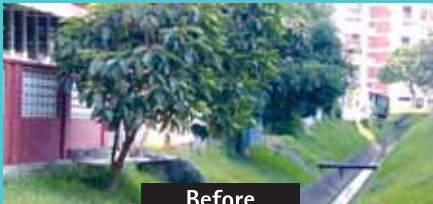


Before



After

## The open drain behind Jalan Kemajuan



Before



After

## The view of Jalan Kemajuan from Joo Seng Estate



Before



After

# Events

(May - June 2010)

## Contact

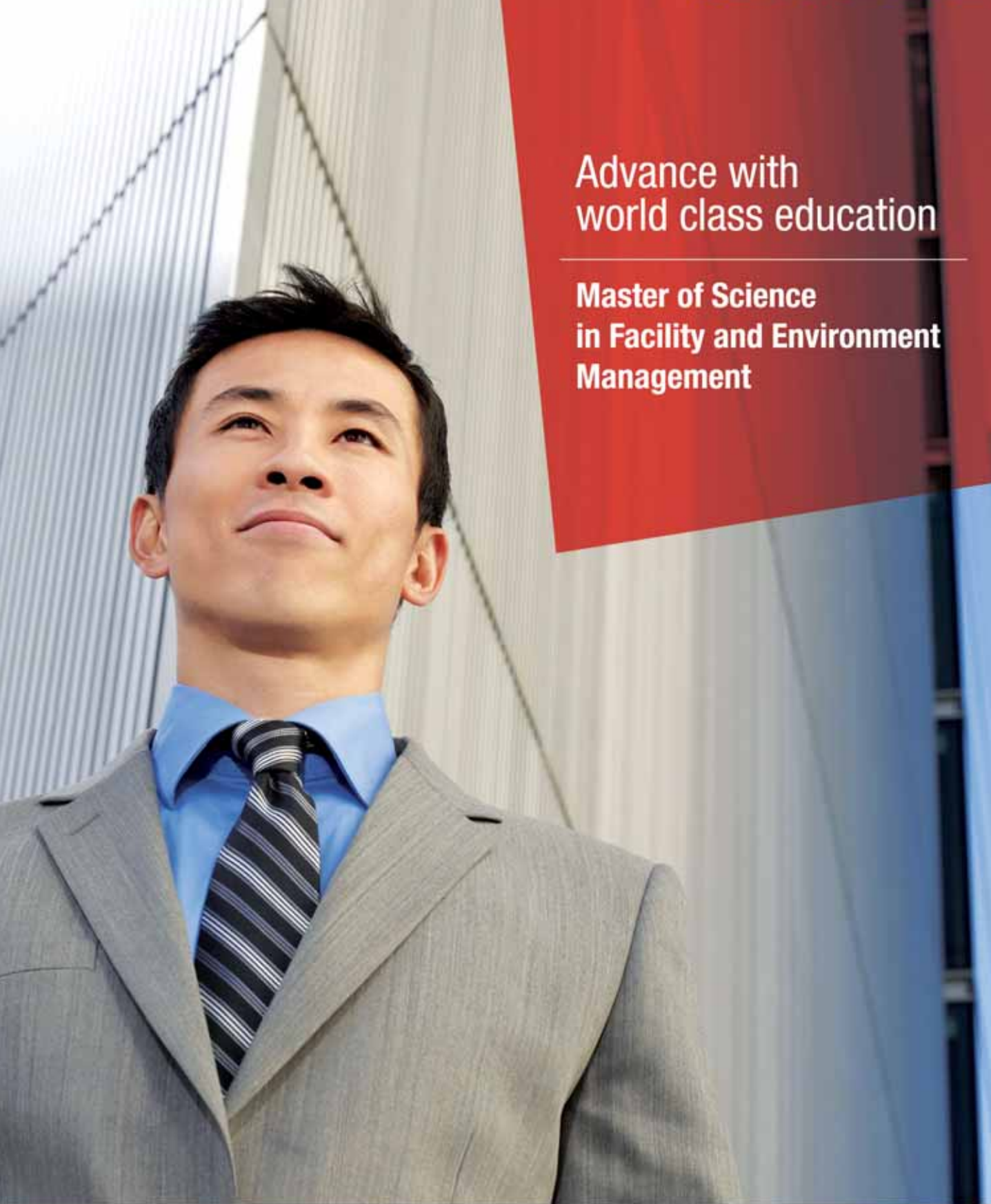
BCA Academy  
 - Business Development Unit  
 DID: 62489843/824  
 Email: [bca\\_academy@bca.gov.sg](mailto:bca_academy@bca.gov.sg)

## Date

## Event

3 & 4 May 2010	Sustainable Acoustics (GMP - Elective Module)
3 May ~ 14 Jun 2010	Certification Course for Structural Steel Supervisor (StS)
4, 6, 11 & 13 May 2010	Supervision of Piling Works for Engineers & Supervisory Personnel
6 & 7 May 2010	2-day Workshop on "Behavioural Safety for the Construction Industry"
6, 7, 10 & 11 May 2010	Energy Management & Audit
10, 11 & 12 May 2010 (Mandarin) / 21, 22 & 23 Jun 2010 (English)	Essential Knowledge in Construction Regulations & Management for Licensed Builders (Mandarin)
13 & 14 May 2010	Planning & Management of Home Renovation
17 & 18 May 2010	Renovation for Public Housing
17, 18, 20 & 24 May 2010	Pile Foundations Design and Construction for Engineers
20, 21, 24 & 25 May 2010	Building Energy Modeling & Thermal Simulation (GMP - Core Module)
26 & 27 May 2010/ 24 & 25 Jun 2010	Risk Management Course (BizSAFE Level 2)
8 & 9 Jun 2010	2-day workshop on "Deliver Your Presentation with Powerful and Professional Performance"
21, 22 & 23 Jun 2010	Passive Building Designs for Natural Ventilation (GMP - Elective Module)
22 Jun ~ 8 Jul 2010	Internal Audit (QEHS) Course Based on Quality ISO 9001, Environmental 14001 and Health & Safety OHSAS 18001
22 & 23 Jun 2010	Design & Installation of Electrical Installation Complying With CP5 & CP88
28 Jun ~ 5 Aug 2010	Certification Course for Structural Steel Engineer (StEr)
Starting on 18 Aug 2010	Singapore Management University-BCA Advanced Management Programme for Leaders of The Building & Construction Industry
Sep 2010	Vietnam National University-BCA Advanced Management Programme: Real Estate Development in Vietnam
Starting in Sep 2010 (Closing date for application: 11 Jun 2010)	Master of Science in Facility and Environment Management (University College London)
Starting in Sep 2010	Master of Science in Sustainable Building Design (The University of Nottingham)
Oct 2010	Tsinghua University-BCA Advanced Management Programme: Real Estate Development & Management in China





Advance with  
world class education

**Master of Science  
in Facility and Environment  
Management**

UCL, University College London, ranked 4th globally under the *Times Higher Education Ranking*, would be offering for the 1st time in Singapore, Master of Science in Facility and Environment Management. The programme presents a unique opportunity to engage in critical learning.

For registration and enquiries,  
please call 6248 9843 or 6248 9824  
or email us at [bca\\_academy@bca.gov.sg](mailto:bca_academy@bca.gov.sg)

[www.bcaa.edu.sg](http://www.bcaa.edu.sg)



**BCA ACADEMY**  
of the built environment