

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

# **BCA Academy - Graduation Special**

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### **BCA Academy -**





In this issue of Pillars, we celebrate the achievements of the BCA Academy as it held its first graduation ceremony. We also take a peek into some of the exciting changes that are coming up at the Academy.







Dr Mohamad Maliki Bin Osman viewing a model of the Zero-Energy Building.



Mr Yap Chee Keong, the Gold Award winner, giving a valedictory speech.

On 7 November 2007, the BCA Academy of the Built Environment held its first graduation ceremony since its transformation from its predecessor - the Construction Industry Training Institute. Close to 380 diplomas and certificates were awarded by the Academy at the ceremony held at the Marriott Hotel.

Guest-of-honour Dr Mohamad Maliki Bin Osman, Parliamentary Secretary for National Development, congratulated the graduates in his speech. He announced that the Academy would introduce a new certificate-level framework next year. Called the National Building Qualifications (NBQ), it would provide a means for working adults as well as school leavers to upgrade their skills. Graduates with the NBQ certificates would be able to enroll in the diploma programmes at the Academy.

Dr Maliki also announced that the BCA Academy would retrofit an existing building at its Braddell Road premises into a Zero-Energy Building (ZEB). As BCA's flagship research and development project under its Green Building Masterplan, the ZEB would integrate various green building technologies in a single building to demonstrate how a building could be retrofitted to be energy-efficient. When completed in 2009, the ZEB would house green classrooms and offices, as well as a visitor centre that can be used for training purposes. The retrofitted building would also function as a test-bedding centre for Green Building Technologies, to allow fresh ideas to be tested and experienced before wider adoption. The Zero-Energy Building project is yet another example of the leadership role the Academy plays in spearheading the research efforts in the industry.



BCA Academy has a rich legacy that spans more than two decades. It started as the Construction Industry Training Centre (CITC) at Punggol in 1984. And in May 1994, the centre opened a new training premise at Bishan to meet the increasing demand. It was renamed the Construction Industry Training Institute (CITI).

More than ten years later, in May 2007, CITI underwent a restructuring and became the BCA Academy. Besides providing training for craftsmen and supervisors, more specialist training in the niche areas of R&D, building safety and quality, barrier-free accessibility and environmental sustainability were introduced.

# The PLACE that BUILDS CAREERS

The face of the construction industry is changing all over the world. The need for user-friendly buildings that are also environmentally friendly, as well as the public desire for aesthetically pleasing designs pose new challenges for the builder of today.

BCA Academy, the education and research arm of BCA, offers a variety of full-time and part-time training programmes - for students, workers, supervisors and even managers. All of which are recognised by various government agencies.

We talk to four individuals, graduates and employers alike, to discover how BCA Academy has helped them.



Mr Thomas Ho
Director
Ong & Ong Architects Pte Ltd

Progress factors largely in Thomas' life. "Keeping abreast of both economical and social changes is important as a practitioner," says Thomas.

The attendee of BCA Academy's Continual Professional Development Programme is happy that the professional development courses and workshops offered by BCA Academy are more intensive with a focus on niche specialisation.

"Attending the recent workshop on Universal Design, conducted jointly with the Glasglow School of Art, has given me more comprehensive and detailed insights of Universal Design," he revealed. "Such programmes facilitate the industry to discharge their duties more diligently."

Thomas also continuously sends his staff to BCA Academy's training programmes on regulatory requirements. "The course on buildability requirements, for example, provides concise information that is useful for application in their daily job," he said.

"In fact," he enthused, "I'm looking forward to attending the certification course for Green Mark Managers that is in the pipeline at the Academy. I think that architects can do a lot more in the area of green building technology."



You might call Chiew Ping a self-made woman. Despite having to pay for her own BCA Academy diploma course, Apple was not deterred.

Sensing her determination to become an interior designer, Chiew Ping's 3D software and landscaping lecturers encouraged her to take part in contests, giving her greater exposure.

After graduating, Chiew Ping worked as a designer with Y2 SPACE. She felt that BCA Academy gave her a good grounding in her basics, and she also credits her industrial attachments for preparing her for the working world.



Chiew Ping dreams of starting her own design firm. For those who share her dreams of working in the built environment, Chiew Ping wholeheartedly recommends upgrading themselves at BCA Academy.



Chee Keong's passion for the built environment stems from his childhood when he once gazed down from the roof of Westin Stamford. Says the Gold Award winner from BCA Academy's graduating class of 2007: "I've always been interested in buildings since then!"

"BCA Academy equipped me with the necessary technical skills and more importantly, the name of the school also led me to several job offers," he said.

Chee Keong was actually inspired by his lecturer Mr H S Chua, who is a certified Professional Engineer in several countries. "He is a role model who has achieved a lot. I wanted to follow in his footsteps."

Chee Keong now works at Woh Hup Pte Ltd, to which he was attached during his industrial orientation programme. "If BCA Academy offered degree courses, I would like to come back. Hopefully on a Civil Engineering scholarship."



### **BCA Academy - Opening Doors**

We also spoke to an employer of BCA Academy graduates, Mr Pek Lian Guan. The Managing Director of Tiong Seng Contractors tells us how BCA Academy has helped the local industry.

Q: Four of your employees are BCA Academy araduates. How would you describe their work?

PEK: We've hired quite a few BCA Academy graduates and we find that they are more ready and better prepared to embark on a career, to take on the challenges of this exciting world in the built environment.

Q: Would you be open to collaborating with BCA Academy in opening up new Specialist Diplomas/Programmes, for your other employees?

PEK: Yes, I think we can explore such a collaboration. In fact, Tiong Seng Contractors regularly sends its employees to BCA Academy. Our industries need to upgrade ourselves and acquire advanced technology that will depend less on labour, but generate greater efficiency and output. BCA Academy can provide learning that will address these needs.

Q: How do you feel about BCA Academy's continual enhancement of its facilities?

PEK: I think BCA Academy's role is strategic – with their Zero-Energy Building for research, for example. Environment protection is set to be huge on the agenda in the next decade. Hopefully, BCA Academy will drive the sharing and development of industry expertise forward.

## 

Researchers: Associate Professor Lee Siew Eang NUS

> Assistant Professor Stephen Wittkopf NUS



The BCA Academy will retrofit an existing building into a Zero-Energy Building (ZEB). The ZEB is BCA's flagship R&D project under its Green Building Masterplan and is partly funded by the MND Research Fund for the Built Environment.

When completed in 2009, the ZEB will house green classrooms and offices, and also function as a test-bedding centre for Green Building Technologies.

### **Energy Efficiency in the ZEB**

### **Energy Efficient Envelope**

The 2 key green features are:

- Low-e glass Unlike normal clear glass, it has a special low emissivity coating. This increases the energy efficiency of windows by reducing the transfer of solar radiation through glass.
- Shading devices With strategically placed shading devices, there is a significant reduction of solar heat gain and improvement of the quality of natural lighting within ZEB.

### **Lighting System**

Using various features such as energy efficient lights, automatic photosensors and daylighting, there is a marked reduction in energy required for artificial lighting within ZEB.

### **Active Control and Management**

The ZEB has an advanced Building Management System to control, monitor and manage all the equipment installed in the building. With close monitoring of usage and occupancy patterns, energy can be optimised while maintaining comfort and functionality.

### **Air-Conditioning System**

Through technologically advanced chillers, variable speed drives, and personalised ventilation system, there is about 55% reduction in energy required for air-conditioning systems.

### **Fully Powered by the Sun**

All three generations (1G, 2G & 3G) of photovoltaic systems will be installed to harness energy from the Sun to generate electricity and power all the appliances and lighting in the ZEB.

#### 1 G

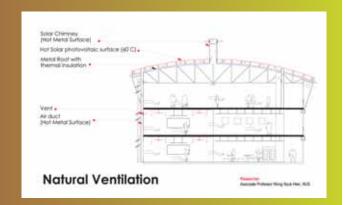
- Cells made from silicon wafer
- Types: monocrystalline silicon, polycrystalline silicon
- High efficiency and need less surface area to generate electricity but more expensive to manufacture
- Suitable for rooftops and integration into building facade and skylight

#### 2G

- Thin-film deposits of semiconductors
- Types: amorphous silicon, copper indium selenide/sulfide
- Flexible, lightweight, less silicon intensive and aesthetically pleasing
- Suitable for rooftops and integration into building facade and skylight

### 3G

- Departure from 1G and 2G which are siliconbased technologies. Promising new approach currently under commercial development
- Flexible, lightweight and aesthetically very pleasing
- Types: Dye-sensitised solar cells, polymer solar cells, photo electrochemical cells, nanocrystal cells
- Suitable for integration into building facade and skylight



### **Future Green Classroom in the ZEB**

The Future Green Classrooms being test-bedded at ZEB will bring together a number of practices and techniques to improve indoor comfort for learning and to minimise impact on the environment. It will also allow students to learn about sustainability through their day to day activities in a green environment.

### Improved Natural Ventilation for Greater Comfort

Using heat generated by the solar photovoltaic to promote a stack effect, there will be better air circulation in the classrooms.

### Improved Green Environment for Greater Calm

With rooftop and vertical greenery, there will be a marked reduction of the inside wall temperature and heat gain through the walls.

### Improved Lighting for Greater Productivity

Students will enjoy enhanced daylight created by the light shelves. Daylight can enter deep into the classroom, reducing as much as 20% of energy consumption.

### **Open Layout for Greater Efficiency**

Through the open layout concept, there is more flexibility for different types of teaching format, thus maximising the use of limited space.

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### New Accessibility



Minister of State Ms Grace Fu announced the new "Code on Accessibility in the Built Environment 2007" at a seminar on 12 October 2007. Ms Grace Fu and BCA CEO Dr John Keung launched the new code at the seminar.

### More mandatory accessibility features will allow more people to move around more effectively.

Wheelchair users and families with young children will soon be able to move easily from one building to another. From April next year, new accessibility features will be required to connect buildings to buildings as well as buildings to parks, open spaces, transport nodes and bus shelters.

These changes are covered under the new "Code on Accessibility in the Built Environment 2007", which will kick in on 1 April 2008. Its new name aptly describes its role for providing more than just accessibility within buildings. The code was previously known as the "Code on Barrier-free Accessibility in Buildings". Since its inception in 1990, the code had undergone three reviews. With each review, the scope of the code was expanded to cater to the needs of a wider group of people, including wheelchair users, the elderly, expectant mothers and families with children.

In this latest review, the Code Review Committee worked together with the aim to create a more accessible and seamlessly connected built environment for everyone. The 15 committee members came from relevant government agencies, industry players and voluntary welfare organisations. Before this revision, the code provided only for accessibility from the main entrance to a building and the common areas within the building.

# Code Announced



Ms Grace Fu presented certificates of appreciation to the Code Review Committee members.

A mini exhibition gave seminar participants an idea of how accessibility concepts could be implemented practically on-site.

BCA presented all participants with its new Universal Design Guide, which aims to provide the industry with a set of recommendations applicable to all building types.

The new code was announced by Minister of State for National Development Ms Grace Fu at BCA's "Accessibility in the Built Environment" seminar and exhibition. Some 400 building professionals, developers and building owners gathered in eager anticipation of the announcement on the morning of 12 October 2007 at the seminar.

Besides the launch of the code, the seminar also included presentations by three speakers. Professor Alastair Macdonald from the School of Design of the Glasgow School of Art presented a paper on "Universal Design across the Globe". Mr Tom Huzell, Managing Director of IKANO, then shared IKEA Singapore's experiences in making the premises of IKEA (Tampines) friendly to people of various abilities, that led to the clinching of the BCA Universal Design Gold Award. Finally, Ms Goh Siam Imm, Deputy Director at BCA highlighted the salient points of the "Code on Accessibility in the Built Environment 2007".

In addition, a mini exhibition showcased how accessibility concepts could be implemented practically on-site. BCA put together this exhibition with the help of the Housing and Development Board, National Parks Board, Land Transport Authority and Town Councils. A series of exhibition panels showed completed and planned upgrading works in various parts of Singapore's built environment as well as BCA's Accessibility Fund which copays up to 40% of basic accessibility upgrading works in pre-1990 buildings.

For further details on the amendments in the "Code on Accessibility in the Built Environment 2007", please log on to BCA's website at www.bca.gov.sg.

# COMPAC GREEN Walls

### Made from recycled aggregates





Recycled aggregates obtained from the concrete from construction, renovation and demolition of old buildings, are put to good use in the COMPAC GREEN wall system.

The National University of Singapore has successfully turned recycled aggregates into internal wall partitions. Its COMPAC GREEN wall system, which recently started its trial production, is another step towards creating a sustainable and environmentally friendly built environment in Singapore.

The recent disruption in concreting sand and granite supply has presented opportunities for the industry to explore alternative technologies and construction methods to enhance the supply resilience of materials. In fact, BCA has been promoting sustainable construction methods, which include the use of materials that can be readily recycled and reused for the same or similar purpose.

The COMPAC GREEN wall system spun off from an earlier BCA-supported project to research and develop high-strength lightweight concrete for non-structural applications. Taking this further, research efforts by Associate Professor Wee Tiong Huan and his team from the University's Department of Civil Engineering produced the COMPAC wall system by an optimal extrusion technique. The technique results in a homogeneously well-compacted cross-section for increased strength and robustness while further reducing the weight. This technology can be scaled to meet the commercial needs of large-scale precasters and contractors carrying out on- or off-site precasting works, depending on the availability of space and logistics.

While the initial idea was to use natural aggregates, the University responded to BCA's call for recycling of construction waste and explored the use of recycled aggregates instead. These recycled aggregates were obtained from the concrete from construction, renovation and demolition of old buildings.





The trial production of the COMPAC GREEN wall partitions was witnessed by industry practitioners and BCA senior management.





Preliminary tests carried out in the University have strongly indicated that the walls made from 100% recycled aggregates are able to satisfy Singapore Standards SS492:2001 - performance requirements for strength and robustness for partition walls. The project team believes that the COMPAC GREEN wall system will be a viable solution for use in residential, commercial and industrial projects.

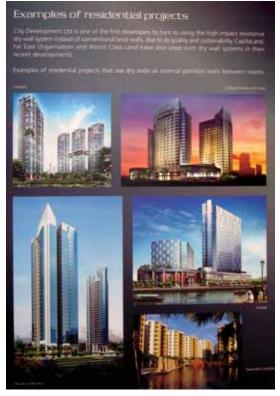
"The COMPAC GREEN wall itself is recyclable as it can eventually be demolished and reproduced as new hollow core walls without the need of virgin sand. The successful production of this COMPAC GREEN wall clearly signals the potential of recycling materials," cited Associate Professor Wee Tiong Huan. "With an estimated 1.0 to 1.2 million tonnes of demolition waste produced annually and with the increased en-bloc activities, there is great potential in tapping on these recycled aggregates for applications in non-structural building components. This would help to bring the industry to another milestone in promoting sustainable construction."

For further details on COMPAC GREEN wall system, please contact Assoc Prof Wee Tiong Huan of National University of Singapore at cveweeth@nus.edu.sg or 6516 2551.

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### Student Outreach in Sustainable Construction





For more information on the exhibition, please contact Ms Ng Geok Kuan at 6325 5068 or ng\_geok\_kuan@bca.gov.sg.

Sustainability is a commitment that has to be made by present and future generations. After a successful exhibition on sustainable construction earlier this year at URA Centre, BCA brought the exhibition to tertiary institutions to share the issues of sustainability in the building industry with students. The exhibition featured the use of steel as an alternative construction material and other substitutes such as copper slag and recycled aggregates.

The exhibition was held at Ngee Ann Polytechnic from July to August 2007, before moving on to Republic Polytechnic for a one-month display in conjunction with its Eureka Symposium with Environment Theme.

Mrs Grace Quah, Director from Ngee Ann Polytechnic's School of Engineering Building & Environment Division, said: "The exhibits were good illustrations of practical and achievable sustainable construction measures. Our students have certainly gained a better understanding of the subject from the exhibition."

Dr Tan Lay Pheng, Manager for Technology Development Centre in Environment Technology at Republic Polytechnic, added: "A big thank you to BCA for providing the posters on Sustainable Construction to make the Republic Polytechnic Eureka Symposium with Environment Theme a huge success. The posters were extremely helpful for our students in the Environmental Diploma to give them better perspectives of how science can help protect the environment!"

The exhibits will be display at the "5th International Conference on Advances in Steel Structures", which will be held at the Grand Copthorne Waterfront Hotel from 5-7 December 2007. Next year, BCA plans to hold the exhibition at National University of Singapore from February to March and at the "International Conference on Structures in Fire", which will be held at the Nanyang Technological University from 28 - 30 May.

# New Award for Safety in Design and Engineering

At the Institution of Engineers Singapore (IES) annual dinner on 26 October 2007, Minister for National Development, Mr Mah Bow Tan announced that BCA would be launching a new award - "Design and Engineering Safety Excellence Award". The Award would be part of BCA's efforts in ensuring high safety standards in the built environment and inculcating a strong safety culture in the building industry.

The Award would recognise the efforts taken by the professional engineer and the members of the project team in overcoming project challenges and ensuring safety in the design and construction of a building through achieving ingenious design processes, measures and solutions. Through the introduction of this Award, BCA hopes to encourage industry professionals to make a more concerted effort to create a safe built environment for all.

The assessment criteria of the Award covers two key aspects in the building development, namely safety in design and construction. The criteria includes design processes and features with an emphasis on safety, quality details and specifications, and design for safe operation and maintenance. Points will also be awarded for high standards of site management and efforts to ensure building and public safety beyond the statutory requirements. The project team will have to demonstrate that they had well-defined supervision procedures, comprehensive testing, inspection and monitoring programmes and other safety efforts to minimise impact to surrounding properties, such as good safety provisions and management of construction.

An assessment committee, chaired by Mr Pek Lian Guan, BCA Board Member, will judge the entries. The committee comprises representatives from the professional associations, universities and BCA. The nomination for the awards commences in November 2007 and the inaugural Award will be presented at the BCA Awards Ceremony in 2008.



At a seminar on "Approach to Structural Inspection and Slope Stability" on 5 October 2007, BCA highlighted the enhancements to the guidelines of the periodic structural inspection scheme. Among other changes, a key enhancement was the inclusion of new guidelines for inspection of slope structures.

The enhanced guidelines were the result of a BCA review to ensure that the periodic structural inspection scheme remains effective in sustaining a safe built environment.

The response to seminar was overwhelming, attracting 480 participants including building owners, management corporations and government agencies, professional engineers and property managing agents.

In his opening address, Mr Ong Chan Leng, BCA's Director of Special Functions, emphasised that property owners must play a proactive role in regular structural inspection and proper maintenance of buildings. This was because no one else would be serious about property maintenance if the property owners themselves showed no concern to do so.



Like all properties, buildings and slope protection structures can deteriorate over time to a point that they may fail if the structural defects are left unattended. In the event of structural failures, the damages and restoration would cost many times more than regular inspections and maintenance efforts.

Hence, the property owners, professional engineers and property managing agents are urged to:

- be committed to mandatory periodic structural inspection and take preventive measures to sustain a safe built environment
- play a proactive role in regular structural inspection and maintenance of building and slope stability
- be vigilant and rectify structural defects quickly



### **BCA Showcase at Cityscape Dubai**

BCA's achievements in Construction Quality Assessment System (CONQUAS) and Construction and Real Estate Network (CORENET) were recently highlighted to 40,000 professionals from the global real estate industry. For the first time, BCA participated at the Cityscape Dubai Conference & Exhibition which was held from 16 to 18 October 2007.

Participating at the Singapore City Pavilion, BCA joined other public and private organisations to promote Singapore as a great city offering exciting live, work and play options and attractive investment opportunities. With the theme "Singapore, Global City, World of Opportunities", the pavilion aimed especially to attract Middle Eastern investors, who currently form a large part of the foreign investment in Singapore's commercial and residential property market. This was the first time a Singapore pavilion had been set up at this premier global international property event.

At the pavilion, BCA showcased its initiatives to shape a safe, high quality, sustainable and friendly built environment in Singapore, giving prominence to its significant achievements in CONQUAS and CORENET. It also promoted the capabilities of the Singapore construction industry and other BCA consultancy capabilities and services to the Middle East market.





BCA promoted its initiatives and the Singapore building expertise to Middle East.

Middle East was the leading market for Singapore construction exports in 2006, with about S\$1 billion worth of contracts clinched by local builders. It is likely to remain a key market for Singapore-based firms in the next few years.

### Facts on Cityscape Dubai 2007

Cityscape Dubai, which began in 2002, is the largest business-to-business real estate investment and development event in the world.

- Exhibition floor area: 70,000 sqm
- Number of exhibitors: 1,000+
- Estimated number of participants: 40,000
- Exhibitors profile: Cities and regional authorities, property financiers, property owners and developers, architects, urban planners, consultant engineers, and contractors from 120 countries.

# in knowing your application status

Qualified Persons (QPs) have been enjoying accurate and timely information on the status of their plan applications with BCA since the roll out of the EASE (Email, Auto-SMS and self-help Enquiry) system in July 2007.

Many Qualified Persons (QPs) would remember the experience of checking the status of their plan applications submitted to BCA in the past. After submitting a plan to BCA through the CORENET e-Submission System, a QP would receive a simple acknowledgement e-mail to inform him that CORENET had forwarded the submission to BCA. Another e-mail would be sent by CORENET later to say that BCA had replied. Whenever the QP needed to check on the status of the application, he would need to make a call to the CORENET helpdesk or log-in to CORENET to download the reply and digitally un-sign the reply to read the detailed status.

#### E-mail includes relevant information

For added convenience, EASE now sends one e-mail to the QP, which includes relevant information, such as the contact details of the processing officer. The QP can now contact the BCA officer directly for status checks. Once BCA has made a decision on the application, an e-mail will be sent to the QP to inform him of the outcome.



### **Auto-SMS and Self-Help Enquiry through BCA website**

In addition, BCA reaches QPs through more modes of electronic communication. In fact, BCA is one of the first agencies in Singapore to communicate via short message services (SMS). QPs can choose to receive SMS alerts on their mobile phones to be informed of the outcome of their applications to BCA. They can also check their application status anytime on the BCA website.

### **Customer Satisfaction Survey**

To continue improving service levels, BCA has introduced a customer satisfaction survey on plan applications, sent with the e-mail notification, for QPs to provide service feedback.

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# Reconstruction Assistance in Post-Tsunami Maldives

BCA joined other Singapore agencies to build a school in post-tsunami Maldives

Primary and secondary school students in Maldives will now have a new school on Hulhumale Island to continue their formal education. Hulhumale Island, located near the capital of Male, has been slated to house several thousand displaced persons affected by the 2004 tsunami.

To build this \$\$8.6 million integrated primary and secondary which can accommodate about 900 students, BCA's Project Management Department worked closely with the Construction Industry Joint Committee to bring in Singapore consultants and contractors. The project consultants comprised the Singapore Institute of Architects, the Association of Consulting Engineers and the Singapore Institute of Surveyors and Valuers, while the appointed contractor was Singapore Piling. As a result of tireless efforts of the entire project team, the project was completed on time and within budget.

Singapore's President S R Nathan and Maldives' President Maumoon Abdul Gayoom officiated at the handover ceremony of the school to the Maldivian government on 25 October 2007. This symbolic event was also attended by representatives from BCA, the Ministries of Foreign Affairs and Education, the Construction Industry Joint Committee, Singapore Red Cross and Singapore Piling.



Representatives from BCA and the rest of the project team attended the handover ceremony.







The Maldives school inauguration on 25 Oct was officiated by Singapore's President and Maldives' President.

The construction of this school was part of an assistance package from the Singapore Government together with contributions from Singapore Red Cross and Temasek Holdings to support the reconstruction of tsunami-affected areas in Indonesia, Maldives and Sri Lanka. Apart from the Maldives school, a pier in Meulaboh, Indonesia, was earlier constructed in 2006. More of such projects will be completed in Indonesia and Sri Lanka.



Date	Event	Contact
30 Nov 07	Workshop on "Recycling For Sustainable Construction"	Xanna Tan DID: 62489824/843 Email: xanna_tan@bca.gov.sg
5 Dec 07	International Symposium on "Advances in Steel Structures"	Huang Xiao Man DID: 62489843/824 Email: huang_xiaoman@bca.gov.sg
15 Jan 08	"Construction & Property Prospects 2008" Seminar at Orchard Hotel Singapore	Siti Aloyah DID: 6325 5195 Email: siti_aloyah_ishak@bca.gov.sg
		Melinda Quek DID: 6325 2107 Email: melinda_quek@bca.gov.sg
22 Feb 08	FuturArc Forum 2008	Sally Kheng (BCI Asia) Email: s.kheng@bciasia.com

### **Contest**

- 1. Name the upcoming building at the BCA Academy that would integrate various green building technologies in a single building.
- 2. What is the new name of the code previously known as the "Code on Barrier-Free Accessibility in Buildings"?
- **3. Who is the Chairman of the assessment committee for the new "Design and Engineering Safety Excellence Award"?**

Send in your answers by 31 Dec 2007 to Editor Pillars, Building and Construction Authority, 5 Maxwell Road, #16-00, Tower Block MND Complex, Singapore 069110. Or e-mail: bca\_enquiry@bca.gov.sg or fax to 63254800. Please indicate your name, designation, company, phone number and address. Selected entries will stand to win attractive shopping vouchers.

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