pillars

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Your views and contributions

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STRONGER CONSTRUCTION DEMAND AHEAD

At the Construction and Property Prospects 2008 seminar, BCA foresees that total construction demand is likely to reach between $23 billion and $27 billion in 2008, if all planned projects proceed as scheduled.

Overall construction demand will continue to be led by the private sector in 2008 on the back of strong GDP growth and potential investment demand, although it is expected to moderate to between $14.5 billion and $16.4 billion. Private residential, commercial and industrial developments are likely to remain strong and are expected to be the main drivers in the private sector in 2008.

The continuing development of the two Integrated Resorts, state-of-the-art industrial developments such as the Renewable Energy Corp's Solar Manufacturing Complex, and Sports Hub are some of the prominent projects propelling the industry's growth.

Public sector construction demand is anticipated to increase to between $8.5 billion and $10.6 billion, with broad-based expansions in all development types. The projection for public sector construction demand has factored in proposed deferment of some government projects. This, however, will be strengthened by stronger public housing demand and the implementation of a number of crucial infrastructure projects to support the nation's development.

Some of the strategic projects to bolster public sector demand include the Jurong Underground Rock Caverns, conservatories for Gardens at Marina South, Changi Airport Terminal 1 upgrading, Marina Coastal Expressway and the remaining contracts of Downtown Line Stage 1.

IMPLICATIONS ON CONSTRUCTION RESOURCES

The simultaneous global surge in construction demand – particularly in China, India and the Middle East – has placed tremendous pressure on manpower, materials and equipment resources. This has resulted in a worldwide escalation of prices for these resources as global demand outstrips supply. Coupled with the global increase in freight and fuel costs, the heightened industry activity will lead to more intense pressure on construction resources and building capacity.

MEASURES TO EASE PRESSURE ON CONSTRUCTION RESOURCES AND CAPACITY

To ensure efficient project delivery, BCA has been actively working with industry stakeholders and relevant public sector agencies to monitor industry needs closely and stay responsive to additional key resources required. Recently, the Government announced a number of proactive measures to mitigate the rise in construction cost arising from the pressure on construction resources and the capacity crunch.

Rescheduling Public Sector Projects

Various government agencies have identified a list of public sector projects in the pipeline for 2008 and 2009 that could be rescheduled to 2010 and beyond. The postponement of these projects is expected to reduce the demand for additional construction manpower required in the next two years by 20% to 40%.

Ensuring Adequate Construction Manpower

To ease the manpower shortage, BCA worked closely with the Ministry of Manpower to implement a new package of foreign workforce measures, which include relaxing the criteria for exempting experienced foreign workers from man-year entitlement requirements; raising the Dependency Ratio and S-pass quota, and relaxing the employment requirements for crane operators, among others.

BCA has also increased the testing capacity of its Overseas Testing Centres at source countries to facilitate the entry of new foreign workers. In addition, BCA has expanded the list of acceptable qualifications for qualified Resident Engineers and Resident Technical Officers (or Clerks of Work) in the BCA's Contractor Registration System. This expanded Resident Engineer list was also accepted in principle by government procurement agencies as the qualification for their contractors' project managers and site engineers.

BCA is working with developers and builders in the industry to expand the resource capability by exploring the possibility of attracting new suitable foreign contractors and specialist contractors to establish their businesses in Singapore.

As the bulk of construction activities and resources in 2008 and 2009 are expected to be concentrated on mega projects such as the Integrated Resorts, Marina Bay Financial Centre, Downtown MRT Line and petrochemical plants, it is expected that more construction resources and capacity will be freed up for other new projects beyond 2009 once these projects have been completed.

Table 1: Contracts Awarded (Excl. Reclamation) by Sector & Type of Work

	2006	2007 (Preliminary)	2008* (Forecast)
Both Sectors	**16.8**	**24.5**	**23.0 - 27.0**
Building Work	**14.9**	**21.5**	**19.5 - 22.8**
Residential	**5.3**	**7.4**	**6.7 - 8.3**
Commercial	**2.4**	**5.2**	**4.5 - 4.7**
Industrial	**5.5**	**7.0**	**5.1 - 5.6**
Institutional & Others	**1.7**	**1.9**	**3.2 - 4.2**
Civil Engineering Work	**1.9**	**3.0**	**3.5 - 4.2**
Public Sector	**3.7**	**5.7**	**8.5 - 10.6**
Building Work	**2.6**	**3.6**	**5.7 - 7.1**
Residential	**1.2**	**1.8**	**2.3 - 3.0**
Commercial	**0.1**	**0.1**	**0.2 - 0.2**
Industrial	**0.1**	**0.2**	**0.9 - 0.9**
Institutional & Others	**1.2**	**1.5**	**2.4 - 3.0**
Civil Engineering Work	**1.1**	**2.1**	**2.8 - 3.5**
Private Sector	**13.1**	**18.8**	**14.5 - 16.4**
Building Work	**12.3**	**17.9**	**13.8 - 15.7**
Residential	**4.1**	**5.6**	**4.4 - 5.3**
Commercial	**2.3**	**5.1**	**4.4 - 4.5**
Industrial	**5.4**	**6.8**	**4.1 - 4.6**
Institutional & Others	**0.5**	**0.4**	**0.9 - 1.2**
Civil Engineering Work	**0.8**	**0.9**	**0.7 - 0.7**

Source : BCA as at 15 January 2008
** forecast*

Insights from Greenbuild 2007

BCA's Chief Executive Officer Dr John Keung, along with Director of Technology Development Division Mr Tan Tian Chong, led a 25-person Singapore delegation, comprising a good mix of developers, architects, M&E consultants, energy consultants, builders and government officers, to Chicago to attend U.S. Green Building Council's Greenbuild 2007. Here are the highlights.

Extraordinary Green Building Movement

The Singapore delegation was deeply moved by the enthusiasm of Greenbuild participants who came from different parts of the world with different areas of expertise. But common among them was the passion for green buildings and a belief that designing sustainable homes, offices, factories and communities was the key to surviving climate change.

The Green Building Council had made tremendous progress since it was founded 14 years ago with 851 LEED-certified buildings and 6,500 buildings en-route to achieving LEED certification. There were more than 40,000 LEED Accredited Professionals. New LEED rating systems for green homes and green neighbourhoods were launched at GreenBuild 2007. The Council would now be retooling all LEED-rating systems to better represent life-cycle analysis as it provided a means of measuring the total impact of a building over its life.

The World Green Building Council had been the foremost organisation setting guidelines to promote green building and to serve as an umbrella for national Green Building Councils around the world, with an increasing number of member countries each year. Green building certification schemes have been gaining popularity throughout the world. Some 21 countries now have unique rating systems that set green building certification standards.

It was crystal clear that green buildings were rapidly going mainstream across the United States and many parts of the world.

Greening American Schools

Former President Bill Clinton was taking great strides in accelerating the greening of American Schools so all American children would eventually go to green LEED certified schools. Research findings presented at GreenBuild 2007 demonstrated that the indoor environment played an important role in improving academic performance and maintaining students' health. Apart from eliminating allergens and chemical contaminants, offering more daylight (shown to boost test scores when glare and noise are eliminated), providing healthy meals, and cycling-out stale air would enhance student learning, reduce health and operational costs and, ultimately, increase school quality and competitiveness.

Driving Forces for Going Green

Corporate social responsibility was also the key driving force for going green as considerations of image and reputation played an increasingly important role in the business-competitive environment. There was a strong involvement of green-minded private organisations in the United States green movement. Even contractors were getting into the act. For example, Bovis Lend Lease, the country's third greenest contractor, was highly commended for its efforts in environmental sustainability.

The business case for green buildings, to many, was an attractive reason for building green. Statistics presented at GreenBuild 2007 showed that the premium cost to build green was substantially lower than was commonly perceived. It was shared that for the first few years, green buildings were supported mainly by government projects, schools and non-profit organisations. Since the beginning of 2005, however, the private sector had discovered the business case for green buildings and was leading the way in new projects for all sectors, including office buildings, retail, hospitality, recreation and healthcare.

Future Trends and Challenges

It was envisaged that climate change would dominate all public policy in the near future. As it was, green building standards were finding their way into the building codes of many states and cities. Boston, for instance, had embraced the call to reduce greenhouse gas emissions contributed by the building sector through mandating green codes for buildings.

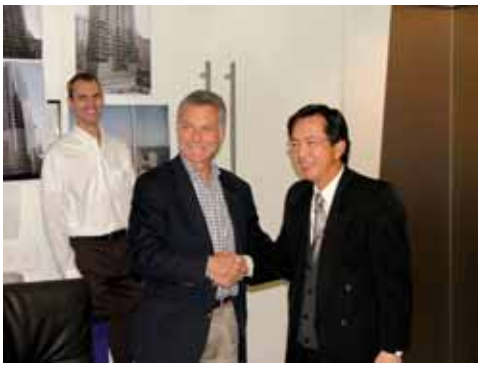
Higher standards for buildings appear to be the way to go. Chicago's Mayor, Richard Daley, had set high standards for all new buildings built by his city to meet the LEED Silver certified criteria, a cut above the minimum standards.

A future with marketable net-zero-energy homes and commercial buildings would help the built environment to be truly energy independent. To help realise this vision soonest possible, one of National Renewable Energy Laboratory's research aims was to integrate energy-efficiency technologies and renewables such as photovoltaics in buildings to produce as much energy as the they use, or even net surpluses.

Held in November 2007 in Chicago, Greenbuild has been the world's largest annual international conference and expo dedicated to sustainable buildings. It was attended by more than 22,500 people, almost doubling the previous year's GreenBuild attendance of 13,500 participants. Greenbuild attracts a larger audience every year. Keynote speakers for Greenbuild 2007included former President Bill Clinton, author Paul Hawken and mayors of various cities.

Apart from participating in the mega GreenBuild event, the Building & Construction Authority also organised various Green & Sustainable Building Tours, meetings with authorities as well as the Chair of the World Green Building Council, Mr Kevin Hydes. The delegation also visited America's primary laboratory, National Renewable Energy Laboratory (NREL), dedicated to renewable energy and energy efficiency R&D.

The insights and ideas arising from the trip were indeed an eye-opening experience for the delegation. The many fruitful exchanges of ideas among the Singapore delegates made it even more beneficial and meaningful. See you at GreenBuild 2008 in Boston!



Afterword

"Thank you for your visit… We appreciated your group's interest and willingness to implement renewable energy and energy-efficient technologies."

Jim Bosch, National Renewable Energy Laboratory

"I much enjoyed the excursion as well as meeting several of the people in the delegation."

Greger Reimann, IEN Consultants

"It was really nice to meet so many of you here in Chicago. The conference and exhibition were a success and I think all of us have learnt a lot from this trip. Let's keep in touch for our new friendship and of course, the Green Buildings in Singapore and beyond!"

Joey Ng, LEED Accredited Professional, Deputy Head (Sustainable Design Technologies), Surbana Technologies

"Indeed it was a fruitful trip"

Adris Isnin, Project Manager, Keppel Land International Ltd

"Thank you BCA for the arrangements."

Richard Phua Teck Meng, Senior Engineer, Squire Mech

Green buildings of the future could be incorporating more recycled material for building works.

BCA held a one-day Conference on "Recycling for Sustainable Construction" on 29 November 2007 at the Suntec Convention and Exhibition Centre and a half-day workshop on 30 November 2007.

Both events were held in conjunction with the ENVIRO ASIA 2007 between 27 and 30 November 2007. The conference was attended by 200 participants from the Building and Construction industry and the workshop was attended by 50 participants.

For the conference, BCA invited a few overseas experts to share with the local participants on the experiences in the United Kingdom and other European countries, Japan, Hong Kong and New Zealand. The conference also included local speakers, who discussed the adoption of the new BS EN code for better quality of concrete, the use of recycled material for building works and the development of sustainable construction for the industry.

Mr Kit Strange from the UK spoke on the current trend in recycling in Europe and the strategies in waste management in the construction industry

The two speakers from the Ministry of Land, Infrastructure and Transport of Japan, Mr Hidenori Furuichi and Mr Takayoshi Furuya shared on the legal system on construction waste recycling in Japan.

Professor Poon from the Hong Kong Polytechnic University presented on technology and the application of recycled products in Hong Kong. He also showed the various methods of recycling construction and demolition waste to achieve sustainable construction.

Dr Ho Nyok Yong, Technical Director from SAMWOH Corporation Pte Ltd gave an overview of recycling technologies and the types of wastes that have been used in road construction and other applications in Singapore.

Other speakers included Ms Yvonne Soh, Dr Tam Chat Tim, Mr Stacy Goldsworthy and Dr Ng Khee Yang. Ms Yvonne Soh from BCA talked about the potential in recycling for the construction sector. Dr Tam, advisor to the SPRING Singapore's Building and Construction Standards Committee, emphasized the importance in ensuring quality of concrete production. Mr Stacy Goldsworthy from Barmac, New Zealand shared on the practices in recycling of C&D waste to achieve economic gains. Finally, Dr Ng from Singapore Polytechnic discussed the potential in recycling unused concrete using his newly developed innovative concrete reclaimer.

Recycling for Sustainable Construction

The workshop on 30th Nov 2007 was well attended by professionals from the construction industry. The participants were briefed by Dr Ghosh from Holcim and Dr Tam on the various requirements for recycled concrete aggregate, limitations in the use of recycled concrete aggregate for concrete under the European standards and the potential future trends in making full use of both fine and coarse recycled concrete aggregates in structural concrete.

Design Guide on the Use of High-Strength Concrete

One of the solutions towards sustainable construction is to optimize or reduce the sizes of concrete elements in a building. The use of high strength concrete can help to reduce the structural component sizes and therefore the amount of concrete used per building. Other advantages in the use of high-strength concrete include reduction in the amount of reinforcement required, earlier removal of formwork and propping, less deflection of beams and slabs, and higher durability.

However, the local structural concrete code restricts the use of concrete to the strength of 60 N/mm^2. High strength concrete is a structurally different material from normal strength concrete, and hence the existing design rules cannot be applied to high strength concrete. An expert team, comprising local and overseas experts with knowledge on the use of high strength concrete, was appointed to carry out a study to extend the use Singapore Standard CP65 to cover concrete with strength greater than 60 N/mm^2. The team for this project comprises the following experts:

- A/P Tan Teng Hooi, NTU, Singapore – Leader and principal investigator
- A/P Gary Ong, NUS, Singapore
- A/P Priyan Mendis, The University of Melbourne, Australia
- Professor Albert Kwan Kwok-Hung, The University of Hong Kong, HK SAR
- Mr Albert Leung, Jacobs China Ltd.

The expert team was tasked to update the design provisions in CP 65 to cater for high strength concrete, develop a design guide for the design of structures using concrete strength greater than 60 N/mm^2 and a good practice guide on mix design, concreting and curing of concrete to ensure product conformity and quality of concrete.

Initially, a theoretical study was carried out to assess the impact of increasing the concrete strength on the section size of structural components. The result of the study is tabulated in Figure 1 – Cross Section Versus Concrete Grade. As can be seen from the graph, the section size can be reduced by up to 45% if the strength of concrete is increased from concrete grade 40 Mpa to 100 Mpa. The cost efficiency or reduction in concrete usage is more obvious in structural elements in compression.

The Sail @ Marina Bay uses high strength concrete

The use of high strength concrete also entails many benefits, which will be evident if total project costs, and even more so if service life costs, are considered. These benefits are smaller or more slender columns, more carpark lots, more office or usable spaces, increase on the construction speed, less dead weight which results in savings on foundation and an increase in service life of structure.

Possible areas where high strength concrete can be used are bridge girders and bridge decks in vehicular bridges and flyovers, encasing steel for composite steel columns and concrete columns and shear walls of high-rise buildings.

The most notable use of high strength concrete in Singapore is in The Sail @ Marina Bay. The compressive strength specified was 80 N/mm^2 for the perimeter columns. The structural consultant for The Sail, required the high strength concrete to enhance the lateral resistance of the building. Silica fume was used in the mix design partial replacement for cement in order to reduce the heat of hydration as well as to improve the strength of the concrete. A stringent quality control regime was implemented for the production of high strength concrete to achieve the desired concrete strength consistently.

Building Careers

Dean Wong (left) and mother speaking to a BCA officer at the BCA-Built Environment Scholarship Seminar

At 18, Dean Wong Wei Jie, a second year student from Tampines Junior College, stands at a very important crossroad of his life. He has to make a choice regarding his future career which will determine the course he will take in university and the scholarship he will apply for. Thanks to the BCA-Built Environment Scholarship Seminar, he now has a clear idea about the various career options in the built environment.

The BCA-Built Environment Scholarship Seminar was held on 8 December 2007 specifically to provide students, like Dean, with a deeper insight into the rewarding career opportunities in the built environment.

Mr Chin Chi Leong, Director for BCA's Manpower Development Division, spoke of the exciting times ahead for the industry, both locally and globally. Professors from NUS and NTU also talked about the various courses available for the built environment, while industry professionals were invited to give participants a glimpse into their world of design and creations.

Mr Chin Chi Leong from BCA spoke on the exciting prospects of the industry

Dean was among the students who attended the seminar. He said: "Before I came for the seminar, I was very hazy about what the built environment is all about. Now I have a clearer vision about the various options I have which will help me make a more informed decision."

Second year students from junior colleges learnt about professions in the built environment at the seminar

At the seminar, participants were also provided with details of the BCA-Built Environment Scholarship Scheme. This year, the scheme attracted the participation of leading developers like CapitaLand, City Developments, Keppel Land International and Frasers Centrepoint; consultant firms like CPG Corporation and Meinhardt (Singapore), and the Singapore Structural Steel Society. The scholarship would offer an annual award of at least $10,000 to cover tuition and miscellaneous fees, as well as a three-year bond with the sponsor company.

Just a month ago, on 9 November 2007, BCA had also organised another career seminar for secondary schools' career guidance teachers. Younger students now have the benefit of these teachers to guide them when deciding what subjects to take at Secondary Three. Ms Angeline Swee, a teacher of Raffles Girls' School (Secondary), found the seminar informative as it gave participants an opportunity to interact with industry professionals and gather information to communicate to their students. "I have also learnt what BCA does which goes beyond its name sake," she said.

upcoming events

Date	Event	Contact
21-Feb-08	Seminar - Towards Sustainable Construction using High Strength Concrete & Alternative Steel Materials	Xanna Tan DID: 62489824/843 Email: xanna_tan@bca.gov.sg
22-Feb-08	Singapore FuturArc Forum 2008	Kenneth Tan (Event co-ordinator, BCI Asia) DID: 65367197 Email: k.tan@bciasia.com
27-Feb-08	CONQUAS Training (for developers and consultants)	Xanna Tan DID: 62489824/843 Email: xanna_tan@bca.gov.sg
13 & 14 March 08	Accoustics & noise controls for Building Designers & Facility Management Personnel	Huang Xiaoman DID: 62489843/824 Email: huang_xiaoman@bca.gov.sg

Contest

1. Name a building project in Singapore that makes use of high-strength concrete in the construction process.

2. Where will the US Green Building Council's Greenbuild 2008 be held?

3. What are 2 continuing projects in Singapore that are propelling the building and construction industry's growth?

Send in your answers by 29 Feb 2008 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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