THE 17TH ASIACONSTRUCT CONFERENCE

SINGAPORE-COUNTRY REPORT

Prepared by
Economics Research Department
Business Development Division

BUILDING AND CONSTRUCTION AUTHORITY
SINGAPORE

EXECUTIVE SUMMARY

The Singapore economy staged a moderate growth of about 5% in the first half of 2011, a contrast to the exceptional strong growth of 14.5% in 2010, as a result of the softening global economic conditions. The construction sector growth averaged about 2% in the first half, weighed down by the slower private sector construction activities. Owing to the downside risks arising from the sluggish US economic condition and eurozone's sovereign debt concern, the Ministry of Trade and Industry (MTI) expects the growth of the Singapore economy to reach a moderate pace of 5% for the whole year of 2011.

Total construction demand[1] in 2010 increased by 20% year-on-year to $27.1 billion[2], with the private sector contributing to about two thirds of the overall demand. The strong private sector construction demand was boosted by the upbeat residential property market, award of various major power utilities projects and the Singapore Sports Hub. For 2011, total construction demand is on track to reach the projection of between $24 billion and $30 billion. While the private sector construction demand is anticipated to slow down amidst a more moderate economic outlook, the public sector construction demand is expected to strengthen on the back of stronger civil engineering construction demand led by MRT (Mass Rapid Transit) and related projects as well as the ramp-up in public housing developments.

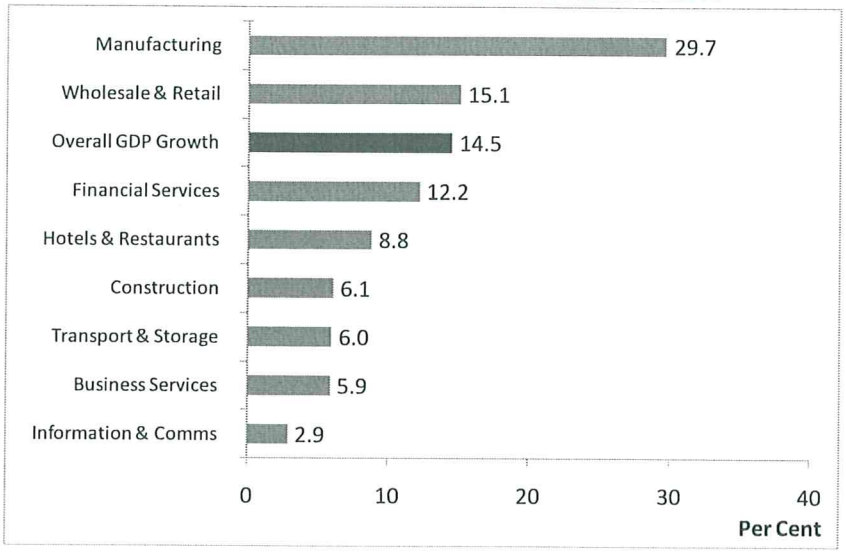
[1] Construction demand is measured by total value of construction contracts awarded. All construction demand figures exclude reclamation projects.
[2] All currencies stated in this paper are in nominal Singapore dollars unless otherwise stated.

2.1 Macro Economic Review and Outlook[3]

2.1.1 Overview of the Singapore Economy in 2010

In 2010, the Singapore economy expanded by 14.5%, compared to the contraction of 0.8% in 2009. The expansion was across all sectors of the economy (Chart 2.1.1). The manufacturing sector rebounded strongly, growing by about 30% in contrast to the decline of 4.2% in 2009. Following the robust year-on-year double-digit growths in the preceding three years, the construction sector expanded by a moderate 6.1% in 2010.

Chart 2.1.1: GDP and Sectoral Growth Rates in 2010



2.1.2 Economy in the First Half of 2011

The Singapore economy registered a modest growth of about 5% in the first half of 2011, weighed down by political turmoil in the Middle East and North Africa region, the calamity in Japan, sovereign debt default in Europe and stalling economy in the US. The growth of construction sector averaged about 2% in the first half due to sluggish private sector construction activities as a result of weakened private sector construction orders in 2009 and overall moderation of construction demand since 2009.

Taking into account the economic performance in the first half and the softening global economic conditions coupled with heightened uncertainties, the MTI expects the growth of Singapore economy in 2011 to be around 5%.

[3] Source: Economic Survey of Singapore, 2010 and second quarter 2011, Ministry of Trade and Industry Singapore.

2 Main Economic Indicators

Year	2006	2007	2008	2009	2010
GDP and Components					
GDP at real prices (Base Year=2005) (S$Million)	226,933	246,846	250,516	248,587	284,561
GDP at current market prices (S$Million)	230,509	267,254	267,952	266,659	303,652
GDP growth (%)	8.7	8.8	1.5	-0.8	14.5
Manufacturing sector (Base Year=2005) (S$Million)	59,838	63,393	60,739	58,218	75,479
% growth	11.9	5.9	-4.2	-4.2	29.7
Wholesale & Retail Trade Sector (Base Year=2005) (S$Million)	37,674	40,679	41,957	39,438	45,412
% growth	9.4	7.8	3.1	-6.0	15.1
Transport & Storage Sector (Base Year=2005) (S$Million)	22,136	23,910	24,757	22,531	23,883
% growth	6.4	9.6	3.5	-9.0	6.0
Financial Services (Base Year=2005) (S$Million)	24,004	27,755	29,001	30,240	33,933
% growth	12.3	14.6	4.5	4.3	12.2
Business Services (Base Year=2005) (S$Million)	22,636	26,141	28,046	29,250	30,977
% growth	8.8	14.1	7.3	4.3	5.9
Construction sector (Base Year=2005) (S$Million)	6,447	7,499	9,008	10,545	11,188
% growth	2.7	16.3	20.1	17.1	6.1
Demographic Indicators					
Population – Singapore Residents[1] ('000)	3,525.9	3,583.1	3,642.7	3,733.9	3,771.7
Population growth rate (%)	1.7	1.6	1.7	2.5	1.0
Total labour force ('000)	2,594.1	2,710.3	2,939.9	3,030.0	3,135.9
Labour force growth rate (%)	9.6	4.5	8.5	3.1	3.5
Unemployment rate (%) – Seasonally adjusted as in June	2.7	2.3	2.2	3.2	2.2
Financial Indicators					
Savings deposits (%) (Average quotes from 10 leading banks)	0.25	0.25	0.22	0.15	0.13
Prime lending rates (%) (Average quotes from 10 leading banks)	5.33	5.33	5.38	5.38	5.38
Changes in consumer price index (Base period = 2009, % change over previous year)	1.0	2.1	6.6	0.6	2.8
Annual average exchange rate with $US (S$ Per US$)	1.59	1.51	1.41	1.45	1.36

Sources: Singapore Department of Statistics, Ministry of Trade and Industry and Ministry of Manpower Singapore.

[1]Singapore resident population comprises Singapore citizens and permanent residents.

3.1 Overview of the Construction Industry (Table 3.1.1)

3.1.1 Construction Demand Review for 2010

Total construction demand in 2010 increased by 20% year-on-year to $27.1 billion. The public sector construction demand totalling $8.4 billion contributed 31% to the overall demand. On the back of extraordinary economic growth, the private sector construction demand rebounded remarkably from 2009 and turned in a robust volume of $18.7 billion, fuelled by the upbeat residential property market as well as construction orders for various major power utilities projects and the Singapore Sports Hub.

Public Sector

Total public sector construction demand in 2010 dropped by around 40% to $8.4 billion. Of which, public residential construction demand remained similar to 2009's level of $2.8 billion in 2010. While institutional construction demand softened slightly to $2.3 billion, industrial construction demand rose to the highest volume since 2003 to close to $1 billion due to the construction orders for Singapore's first Liquefied Natural Gas (LNG) terminal at Jurong Island and active industrial developments at Seletar Aerospace Park. On the other hand, rescheduling of some MRT Downtown Line Stage 3 projects resulted in a drop in public civil engineering construction demand from the high annual volume of about $8 billion in preceding two years to $2.2 billion in 2010.

Private Sector

The remarkable Singapore economic recovery since the beginning of 2010 fuelled a sharp rebound in private sector construction demand. Total private sector construction demand in 2010 was more than doubled year-on-year and reached $18.7 billion, comparable to the levels prior to the onset of the global financial crisis in September 2008.

Residential construction demand surged to a record high of $8.7 billion, bolstered by sanguine sentiments and strong home sales. Likewise, commercial construction demand was boosted by the improved business environment and revival in visitor arrivals, rising to $3.1 billion in 2010. In tandem with the

outstanding performance in the manufacturing sector, industrial construction demand firmed up to $3.3 billion, backed by higher volume of conventional industrial developments and a few sizeable Engineering, Procurement and Construction (EPC) projects for power utilities. Furthermore, institutional construction demand shot up to $2.7 billion, another historical high arising from the construction of the Singapore Sports Hub and two private hospitals.

3.1.2 Construction Demand Forecast for 2011

Based on feedback from developers and public sector agencies on their development plans as well as the recent industry performance, total construction demand is on track to reach the projected $24 billion to $30 billion in 2011. Some of the major projects awarded this year were listed in Table 3.1.2.

The public sector demand is likely to strengthen this year, contributing about 55% of the industry demand to between $13 billion and $17 billion, comparable with the annual levels during 2008-09. The private sector demand is expected to moderate from the preceding year's level, amounting to between $11 billion and $13 billion. Despite the more moderate economic outlook for 2011, the mid-range of 2011 construction demand forecast (at $27 billion) is comparable to the demand level in 2010 due to the strong support from the public sector.

Residential Construction Demand

Public Housing

Sustained by the continual strong public housing demand, total public residential construction demand is projected to be $4.4 billion to $5.8 billion. A majority of the housing construction will continue to be dominated by building of new HDB flats to meet the on-going demand, while the remaining will be primarily contributed by Lift Upgrading Programme and Neighbourhood Renewal Programme.

Private Housing

Private residential construction demand is projected to moderate from last year's record volume to between $5.0 billion and $5.5 billion, in line with the anticipated slower Singapore economic growth in 2011 as well as greater global economic

uncertainties. Nevertheless, this level is still significantly stronger than the $2 billion to $3 billion yearly private residential construction demand posted during the period from 1998 to 2005.

Commercial Construction Demand

Total commercial construction demand is likely to remain comparable to the preceding year's level, amounting to between $2.2 billion and $3.1 billion in 2011. The buoyant office space demand as a result of a pick-up in rentals and capital value appreciation as well as the vibrant retail sector supported by strong influx of foreign visitors have emboldened developers to continue investing in commercial developments.

Industrial Construction Demand

Total industrial construction demand in 2011 is expected to moderate to $3.1 billion and $3.8 billion. While demand for conventional industrial space on the back of positive economic prospects would continue to provide support to the industrial construction demand, this category is likely to be dominated by high-specification and state-of-the-art technological buildings.

Institutional & Other Building Construction Demand

Likewise, total institutional & other building construction demand is projected to slow down to between $2.4 billion and $3.5 billion. The moderation is mainly due to expected reduction in private institutional construction demand from the high base last year. Public institutional construction demand, on the other hand, is anticipated to improve over last year's volume.

Civil Engineering Construction Demand

Civil engineering construction demand is expected to go up to between $6.9 billion and $8.3 billion in 2011. The lion's share of the demand is expected to be contributed by various construction contracts for the MRT Downtown Line Stage 3. In its bid to improve road network to facilitate traffic flow, LTA has also earmarked a number of road construction projects to proceed this year.

Table 3.1.1: Breakdown of Construction Demand

Contracts Awarded by Sector and Type of Work (2003 to 2011*)
(excluding Reclamation Works)

Million Dollars

	2003	2004	2005	2006	2007	2008	2009	2010	2011* Forecast (in $b)
Both Sectors	**10,018.35**	**10,287.38**	**11,456.15**	**16,796.69**	**24,459.88**	**35,684.05**	**22,518.38**	**27,089.06**	**24.0 - 30.0**
Building Work	8,691.57	7,503.90	9,762.50	14,877.86	21,453.79	27,065.86	13,499.06	24,065.89	17.2 - 21.7
Residential	*2,993.96*	*3,863.48*	*3,724.02*	*5,298.38*	*7,361.04*	*11,073.60*	*6,733.87*	*11,506.68*	*9.4 - 11.3*
Commercial	*536.08*	*1,128.01*	*1,009.01*	*2,372.71*	*5,230.25*	*8,455.54*	*1,649.82*	*3,239.24*	*2.2 - 3.1*
Industrial	*2,046.18*	*1,046.75*	*3,119.07*	*5,510.63*	*6,967.52*	*3,741.10*	*2,040.48*	*4,303.67*	*3.1 - 3.8*
Institutional & Others	*3,115.35*	*1,465.66*	*1,910.40*	*1,696.14*	*1,894.98*	*3,795.62*	*3,074.89*	*5,016.29*	*2.4 - 3.5*
Civil Engineering Work	1,326.78	2,783.48	1,693.65	1,918.83	3,006.09	8,618.19	9,019.32	3,023.17	6.9 - 8.3

Source : BCA as at 4 August 2011
** forecast*

Table 3.1.2: Selected Major Construction Projects Awarded (Jan-Aug 11)

Project Description	Development Type	Consultant	Contractor	Award Month
Asia Square Tower 2: Erection of a 46-Storey Office/Hotel Development with Shops and Restaurants at 1st/2nd Storey at Marina View	Commercial	Architects 61	Hyundai Engineering & Construction Co	Jan 11
ITE College Central Campus and Headquarters Development at Ang Mo Kio Avenue 5 (Contract Cost: $388.88m)	Institutional	RSP Architects Planners & Engineers	Kajima Overseas Asia	Jan 11
Metropolis: Design and Build of 21 & 23-Storey Office Tower Blocks with 3 Basement Carparks and Retail Use at North Buona Vista Drive	Commercial	DCA Architects	Lum Chang Building Contractors	Feb 11
Sembcogen CCP3 @ Banyan: Phase 1 of 400MW Second Cogeneration Plant at Angsana/Banyan in Jurong Island	Industrial	Not Applicable	Alstom Power Singapore	Feb 11
Construction and Completion of Tunnels between Ubi and Kaki Bukit Stations & Reception Tunnels for Downtown Line Stage 3 (Contract Cost: $211.70m)	Civil Engineering	Ong & Ong	Nishimatsu Construction Co	Feb 11
Construction and Completion of Bedok Town Park Station and Associated Tunnels for Downtown Line Stage 3 (Contract Cost: $268.68m)	Civil Engineering	Ong & Ong	Sato Kogyo (S)	Feb 11
Downtown Line Stage 3: Construction and Completion of Tampines East Station and Tunnels (Contract Cost: $208.52m)	Civil Engineering	Ong & Ong	GS Engineering & Construction	Jul 11

Project Description	Development Type	Consultant	Contractor	Award Month
Downtown Line Stage 3: Construction and Completion of River Valley Station and Associated Tunnels (Contract Cost: $255.05m)	Civil Engineering	Aedas	GS Engineering & Construction	Jul 11
South Beach: Erection of 2 Blocks of 34-Storey and 45-Storey Mixed Development with a 6-Storey Podium of Hotels, Offices, Retail and Residential units including Addition and Alteration Works of 4 Existing Buildings at Beach Road	Commercial	Aedas	Hyundai Engineering & Construction Co	Aug 11
Downtown Line Stage 3: Construction and Completion of Bendemeer Station and Associated Tunnels (Contract Cost: $215.24m)	Civil Engineering	Aedas	Penta-Ocean Construction Company	Aug 11
Downtown Line Stage 3: Construction & Completion of Upper Changi Station and Tunnels (Contract Cost: $256.98m)	Civil Engineering	Ong & Ong	Samsung C&T Corporation	Aug 11

3.2 Construction Companies

The total number of companies registered under BCA Contractors Registry has been on an uptrend, reaching 9,318 firms by end June 2011. Of these, 81 firms were A1 contractors with unlimited tendering limit for public sector projects.

Table 3.2: Trend of Registered Contractor

Year (calendar)	2003	2004	2005	2006	2007	2008	2009	2010	2011*
No. of registered contractors	4739	5167	5621	5942	6346	7021	7975	8827	9318

Note: Firm with multiple workheads registered is considered as a single registered entity.
*No. of registered contractors as at 30 June 2011

3.3 Construction Manpower

In tandem with the moderation in construction demand since 2009, the robust employment gains in the construction sector during the period from 2007 to 2009 have eased. However, growth momentum of construction employment continued on account of the sustained level of on-site construction activity. According to the latest employment statistics released by the Ministry of Manpower (MOM), construction employment grew by 5,100 in the first half of 2011 to 400,700 as at June 2011. Moving forward, the significant civil engineering construction demand as well as the demand for more green

professionals will continue to provide new job opportunities in the construction industry over the next few years.

3.4 Productivity

Growth of labour productivity in the construction sector (in terms of value-added per employee) remained positive at 2.9% in 2010. Similarly, the site productivity for overall building construction has also improved over the years, progressing slightly from 2.62 manday per square metre in FY2009 to 2.61 manday per square metre in FY2010.

Table 3.4.1: % Change in Labour Productivity in Construction Sector

	2004	2005	2006	2007	2008	2009	2010
Construction Sector	-0.4	0	-3.4	4	-0.8	4	2.9

Note : Based on Gross Value Added at 2005 Basic Prices
Source: Singapore Department of Statistics

Table 3.4.2: Average Manpower Usage, Manday per Sqm

Type of Project	FY2008	FY2009	FY2010
Public Housing (HDB Projects)	2.22	2.20	2.28
Private Residential (landed)	5.21	5.22	5.25
Private Residential (non-landed)	3.27	3.15	3.13
Commercial	3.02	3.03	3.06
Industrial	2.01	1.98	2.02
Institutional	2.18	2.20	2.22
Overall Average	**2.65**	**2.62**	**2.61**

Source: Building and Construction Authority

3.5 Construction Costs

3.5.1 Tender Price Index

Despite the picking up in prices of major construction materials like concrete and steel reinforcement over the year, the average yearly BCA Building Works Tender Price Index[4] (TPI) for 2010 dropped by 1.3% compared to 2010 due to the keen tendering market competition.

Weighed down by the decline in the TPI for HDB flats, the overall BCA's TPI in the first half of 2011 remained at similar level as in 4Q2010. Nevertheless, with

[4] BCA TPI excludes piling works, sub-structure works and mechanical & electrical works as these cost items are either project specific or not feasible to compile due to lack of data.

the ramping up of new HDB flat supply as well as in view of the elevated prices of key construction materials such as steel, construction tender prices will likely see some increases. However, the anticipated uptrend is likely to be moderated by the current weaker global economic outlook which may keep prices of global construction resources from significant escalations.

3.5.2 Average Construction Material Prices (Table 3.5.2)

Concrete

Despite the moderated volume of construction output, demand for ready-mixed concrete in 2010 rose by 5% year-on-year, likely due to higher volume of structural work activities arising from the construction commencement of more projects in 2010. On the contrary, demand[5] for cement in 2010 dropped by 10%. The import sources for cement in 2010 were Japan (51%), Taiwan (25%), Malaysia (15%), and the rest (9%) from China, Thailand and Canada. In 2011, demands for ready-mixed concrete and cement are expected to decrease by 4% and 7% respectively on account of anticipated modest on-site construction activities.

With the increasing demand, the average market price[6] for Grade 40 Pump ready-mixed concrete closed the year with a rebound of 19% to $106.7 per m^3 in December 2010. On the other hand, the average market price for cement (bulk) was $89 per tonne in December 2010, down 5% year-on-year.

Reinforcement Bars (Rebars)

Demand for steel rebars in 2010 declined by 5% compared to 2009's level to 0.98 million tonnes. The key import sources in 2010 included Turkey (46%), Korea (26%) and other countries such as Malaysia, China and Taiwan. In 2011, demand for rebar is projected to reach a similar level to that of last year.

Growth in 2010 global steel demand and the industry's move from an annual to a quarterly pricing system for iron ore (a key raw material used in steel-making), led

[5] Demands for cement and steel rebar are measured in terms of local production and net imports.
[6] The market prices are based on contracts with non-fixed price, fixed price and market retail price.

to a rebound in average market price of rebars[7] to above $900 per tonne in April and May before softening to about $830 per tonne during the third quarter of 2010. Towards the end of 2010, the average steel rebar price edged up again to $867.5 per tonne on higher raw material costs.

Table 3.5.2: Basic Construction Materials

Demand						
Year	Cement (Mil tonnes)	% Change	Ready-Mixed Concrete (Mil m^3)	% Change	Steel Rebars (Mil tonnes)	% Change
2009	4.84	-	9.75	-	1.03	-
2010	4.36	-10%	10.25	5%	0.98	-5%
2011 (F)	4.0	-7%	9.7	-4%	1.0	2%
Current Market Prices						
Year	Cement ($ per tonne)	% Change	Ready-Mixed Concrete (Grade 40 Pump) ($ per m^3)	% Change	Steel Rebars (16-32mm) ($ per tonne)	% Change
Dec 2009	$93.4	-	$89.9*	-	$722.5	-
Dec 2010	$89	-5%	$106.7	19%	$867.5	20%

F: Forecast
**Based on Jan 2010 price*

3.5.3 Construction Industry Salaries and Wages

Average gross monthly wages of construction professionals such as engineers and associate professionals and technicians in 2010 were comparable with the levels a year ago (Table 3.5.3a). Compared to most other major economic sectors, the average monthly earnings per employee in the construction industry remained relatively lower (Table 3.5.3b).

Table 3.5.3a: Mean Monthly Gross Wages in Construction

Category	2005	2006	2007	2008	2009	2010
Professionals ($/month)	3,155	3,237	3,400	3,737	3,871	3,819
Associate Professionals and Technicians ($/month)	2,565	2,646	2,736	2,808	2,830	2,888

Source: Report on Wages in Singapore, various years, Ministry of Manpower

[7]The prices refer to 16mm to 32mm High Tensile rebar and are based on fixed price supply contracts with contract period 6 months or less.

Table 3.5.3b: Average Monthly Earnings Per Employee (S$ per month)

Industry	2005	2006	2007	2008	2009	2010
Average	3,444	3,554	3,773	3,977	3,872	4,089
Manufacturing	3,495	3,618	3,764	3,955	3,966	4,263
Construction	**2,513**	**2,517**	**2,646**	**2,861**	**2,948**	**3,113**
Wholesale and Retail Trade	3,017	3,101	3,262	3,441	3,418	3,546
Transport and Storage	3,507	3,525	3,797	3,989	3,914	3,953
Hotels & Restaurants	1,360	1,381	1,442	1,504	1,463	1,506
Information & Communications	4,553	4,745	5,018	5,304	5,253	5,338
Financial Services	5,949	6,291	6,768	7,153	6,890	7,656
Retail Estate and Leasing Services	2,732	3,053	3,355	3,513	3,273	3,051
Community, Social & Personal Services	3,704	3,831	4,074	4,168	3,857	4,292

Source: Yearbook of Statistics Singapore, 2011

3.6 Conclusion

Singapore economy was estimated to grow by 5.9% year-on-year in the third quarter[8], an improvement from the 1.0% growth in the second quarter due to a pick-up in the biomedical manufacturing cluster. However, economic growth for the rest of the year could be slower owing to the softening global economic conditions. For the whole year 2011, MTI expects Singapore GDP growth to be around 5.0%. In the years to come, Singapore is expected to face slower economic growth amidst weaker global outlook arising from the sizeable government debts in Europe and the fear of a double-dip recession in the U.S.

Over the medium-term, Singapore construction industry's outlook is generally positive in view of the Government's plan to ramp-up the supply of public housing and other essential infrastructure to support a larger population. BCA has projected that the average construction demand is likely to reach between $21 billion and $28 billion per annum[9] in 2012 and 2013.

[8] Advance estimates released by the Ministry of Trade and Industry (MTI) Singapore on 14 Oct 11
[9] This forecast will be fine-tuned again in January 2012.

SINGAPORE'S EFFORTS IN BUILDING CAPACITIES THROUGH CO-OPERATION

Koh Lin Ji and J.Subramaniyam

Building and Construction Authority (BCA)
Singapore

Executive Summary

Singapore is a city with very few natural resources. Resources such as fuel and food have to be imported from around the world. With no natural hinterland, our homes, offices, factories, power stations, parks, roads, reservoirs, military facilities and many other uses have to be fitted within our small area of 700 square kilometres, whilst ensuring that our people still have a clean, green and comfortable environment to live in. With that in mind, Singapore also needs to ensure that its infrastructure meets the needs of its people and the export-oriented economy. With good governance, Singapore has formulated key policies and implemented them successfully throughout the public and private sectors.

Construction industry is one of the significant contributors to the economy. With major investments into sectors such as R&D, electronics, bio-engineering and petrochemicals, the need for infrastructure has grown tremendously. The Building and Construction Authority (BCA) of Singapore has worked closely with various ministries to ensure that the construction industry has the necessary capabilities to function effectively and efficiently. Moreover, it has shared capability building and skills training programmes with various government agencies including China, Cambodia, Malaysia, South Africa and the United Arab Emirates to improve the respective country's construction industry. BCA has also tied-up with the United Nations Environment Programme to establish a Centre on Sustainable Buildings in South-East Asia to promote and elevate sustainable solutions in the building sector.

BCA has expanded its outreach to the region and beyond by working with organisations or associations and governments to build capabilities and capacities. This allows Singapore to share its expertise with the region and contribute a consolidated effort to improve construction industries.

Introduction

The Building and Construction Authority (BCA) is an agency under the Ministry of National Development, championing the development of an excellent built environment for Singapore. “Built environment” refers to buildings, structures and infrastructure in our surroundings that provide the setting for the community’s activities.

Our mission is "we shape a safe, high quality, sustainable and friendly built environment". Safety, Quality, Sustainability and User-Friendliness are four key areas where BCA has a very significant influence on the built environment and they distinguish Singapore’s built environment from those of other cities. Hence, our vision is to have "the best built environment for Singapore, our distinctive global city".

Building Safety

The prime objective of building control is to ensure building works comply with standards of safety, amenity and matters of public policy as prescribed in the Building Control Act & Building Control Regulations. All building works, except those that are minor and exempted under the Schedule in the Building Control Act, will require building plan approval from the Commissioner of Building Control, BCA.

Quality

Quality workmanship is important in today's construction industry. The high quality achieved in building projects ensures future marketability and enhances the confidence of clients. The Construction Quality Assessment System (CONQUAS®), introduced in Singapore since 1989, serves as a standard assessment system on the quality of building projects. A de-facto national yardstick for the industry, CONQUAS® has been periodically fine-tuned to keep pace with changes in technology and quality demands of a more sophisticated population. In 1998, BCA introduced a number of new features to CONQUAS® resulting in the launch of CONQUAS® 21. Such refinements make CONQUAS® scoring more comprehensive and customer oriented.

By using CONQUAS® as a standardized method of quality assessment, developers are able to use the CONQUAS® score to set targets for contractors to achieve and also assess the quality of the finished building.

Today, CONQUAS® is widely recognised and also accepted internationally as a benchmarking tool for quality. Indeed, countries like Malaysia and Hong Kong have successfully adapted CONQUAS® to their construction industries. CONQUAS® is now a registered trademark in Singapore, Malaysia, China, Hong Kong SAR, United Kingdom, Australia, South Africa and India.

Sustainability

The BCA Green Mark Scheme was launched in January 2005 as an initiative to drive Singapore's construction industry towards more environment-friendly buildings. It is intended to promote sustainability in the built environment and raise environmental awareness among developers, designers and builders when they start project conceptualisation and design, as well as during construction. BCA Green Mark provides a meaningful differentiation of buildings in the real estate market. It is a benchmarking scheme which incorporates internationally recognized best practices in environmental design and performance. This can have positive effect on corporate image, leasing and resale value of buildings.

The 1st Green Building Masterplan was launched in 2006 to encourage, enable and engage industry stakeholders to step up efforts in environmental sustainability. With the Inter-Ministerial Committee on Sustainable Development (IMCSD) setting the target to green 80% of our buildings by 2030, BCA released the 2nd Green Building Masterplan, which has a total of six strategic thrusts targeted at three development areas: new buildings, existing buildings and beyond buildings. With the 2nd Green Building Masterplan, BCA will continue to champion a proactive and holistic approach to tackling challenges such as greening of our existing building stock and the building of industry capabilities, in order to realise our vision of the best built environment for Singapore, a distinctive global city.

Universal Design

Universal Design (UD), in the broadest term, is “design for all people”. It seeks to create an environment addressing the needs for all age groups and people of different abilities including temporary disability. The move towards universal design has developed due to the expanding population of people with varying degree of abilities and advancing years, their demands for recognition and desire for independent living.

In Singapore, the relevant authorities are also targeting at more innovative and friendly design to improve usability and liveability for everyone. It is the intention of BCA to instil awareness among designers and building owners/developers who have the influence to cater for the full range of human needs and be sensitive to incorporate them in the design.

To address these needs, BCA introduced a new Universal Design Guide in October 2007 that provides a more complete set of guidelines for adoption in all building designs. It has UD recommendations that are applicable not only to commercial buildings but also a wider range of building types, including residential buildings as well as public and community facilities.

Transforming Industry

a) Overseas Testing Centres (OTCs)

Since 1995, BCA has been meeting the construction industry's needs for skilled manpower by working with Singapore's and host countries' contractors to set up Overseas Testing Centres (OTCs) in the approved host countries, namely India, China, Myanmar, Thailand and Bangladesh. Workers can choose any of the 27 different trades to undergo training and subsequent testing in these OTCs to be certified as trained construction workers for the Singapore market. All foreign construction workers need to pass a BCA trade test and be awarded with the skills certificate before they can enter and be employed in the construction industry. The tests have both written and practical components and workers must pass both to ensure that they possess good basic construction capabilities. BCA continues to work closely with these OTCs to ensure that the skills training are at the highest level.

b) Industry Development

i. Precast Technology

To increase the productivity of the industry, BCA encouraged the industry to adopt precast or prefabrication technology to ensure both high quality and increased productivity is achieved for projects. It has since introduced adequate funds for local firms interested to set up as prefabricators.

ii. Contractor Registry System

The Contractors Registry is administered by BCA to serve the procurement needs of government departments, statutory bodies and other public sector organizations. Except for Regulatory Workheads (RW), the Registry functions as an administrative body only for the public sector procurement. As such, contractors which are not registered with BCA are not precluded from conducting business as contractors or suppliers outside the public sector.

iii. Productivity

BCA has introduced a S$250-million Construction Productivity and Capability Fund as part of the Government's efforts to help the construction industry improve productivity and strengthen its capability. The Fund comprises incentive schemes that focus on workforce development, technology adoption and capability development in Singapore's built environment:

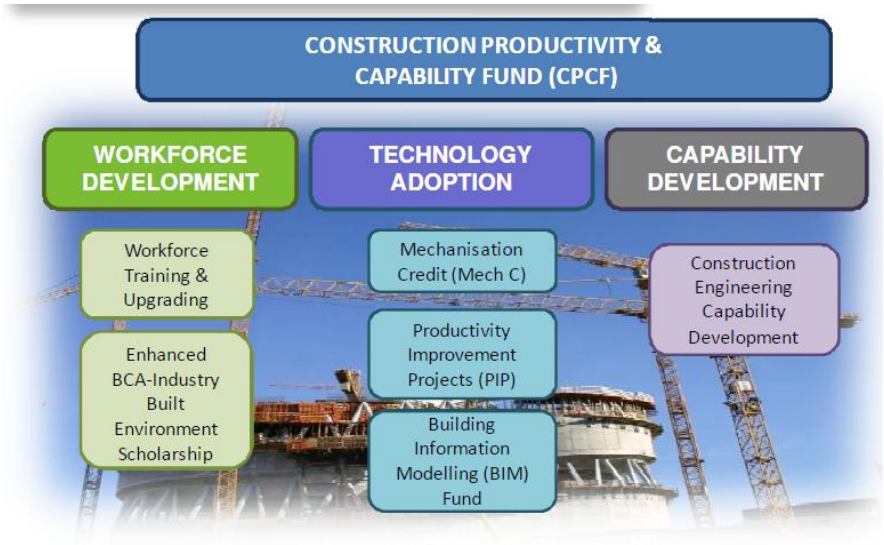


Figure 1: Construction Productivity & Capability Fund (Source: BCA website. http://www.bca.gov.sg/)

International Development

The International Development Division (IDD) was set up in 2003 to actively promote and support our local construction, construction related, and property and real estate companies to venture overseas. In addition, IDD promotes Singapore as a hub for green technologies, facilitates networking with Government officials, the industry and facilitates formation of consortia/strategic alliances for projects. IDD is active in China, India, Indonesia, Middle East and Vietnam since 2003.

Research

a) Zero Energy Building (ZEB)

With the Inter-Ministerial Committee on Sustainable Development (IMCSD) setting a target for the building industry, which is to achieve 80% Green Mark Certification for all buildings by the year 2030, many existing buildings will have to be greened.

To serve as a test bed for integration of Green Building Technologies (GBT) in existing buildings and to be a hub for practitioners and students in the study of energy efficiency and green buildings, the Zero Energy Building (ZEB) was conceived as a collaborative effort among BCA, the National University of Singapore (NUS), the Solar Energy Research Institute of Singapore (SERIS) and partners from the private sector. Located within the BCA Academy, ZEB is retrofitted from an existing building, the first to be achieved in Singapore and Southeast Asia. The technology that are being test bedded in ZEB at the moment will have potential applications for many of the existing buildings that will be striving to achieve Green Mark Certification in the not too distant future. Zero Energy also refers to energy self sufficiency without the need to tap on power supply from the grid at all. For energy scarce Singapore which is also devoid of natural resources, the success of ZEB in achieving this target is exciting and has tremendous implications on the way energy is used in Singapore for specific types of buildings.

b) BCA Centre on Sustainable Buildings

BCA and the United Nations Environment Programme (UNEP) signed an agreement to collaborate on promoting and establishing sustainable building policies and practices in the Southeast Asia region. On 14 September, at the International Green Building Conference 2011 held during Singapore Green Building Week, a Memorandum of Understanding (MOU) was signed, formalizing cooperation between BCA and UNEP to provide policy advice and outreach activities related to sustainable resource management in the building sector.

The agreement between UNEP and BCA formally established the BCA Centre for Sustainable Buildings as a "Centre Collaborating with UNEP" to assist in developing tools, approaches and support to countries in the region in a coordinated effort to elevate sustainable solutions in the building sector. Through identification of successful policies, strategies and technologies at the regional and national levels, BCA will support the propagation of sustainability in the building sector in Southeast Asia.

BCA is currently producing a series of 'State of Play' reports for eight Southeast Asia countries to contribute to UNEP-SBCI's growing publications assessing policies and practices in sustainable building. The formal collaboration will expand these joint activities to include workshops, training, outreach, fundraising, and potentially the implementation of international projects in the region, broadening the reach and distribution of UNEP's work on sustainable buildings and cities. In addition to the country reports currently being produced by BCA for UNEP-SBCI, the groups will develop a joint work plan to guide the collaboration over the coming years.

International Collaborations

a) Capacity Building

BCA has provided assistance to the Malaysian, South African and Abu Dhabi governments to set-up their Building Control and Management Systems and Industry Development programmes. It has provided valuable advice and help through sharing sessions conducted in Singapore and/or the recipient countries so that their government officials have the necessary knowledge and tools to manage their construction industry.

Singapore and Cambodia launched its first multi-agency training programme in Land Management, Urban Planning and Building Control for the Cambodian Ministry of Land Management, Urban Planning and Construction to train 1,140 Cambodian government officials in urban planning and development. The objectives of the capacity building programme are to accelerate the building of capability to support administrative functions at the federal as well as provincial levels; and to embark on the national development and law formulation initiatives to strengthen and enhance its foundation systems for land and urban management, and building control. The participants were also introduced to Singapore's land management, building codes and regulations.

b) Sustainability

Training programmes on Green Building Technologies for Professionals and Managers for the Sino-Singapore Tianjin Eco-City were jointly organised by the Tianjin Institute of Urban Construction, China (TIUC) and BCA Academy (BCAA) to help the practitioners/officials working in the Tianjin eco-city to understand the Green Building Evaluation Standards (GBES) and its requirements, as well as to better understand green building technologies

and management to administer the Green Building Standards more effectively. The training programme provided insights to international development of green buildings; and benchmarking, comparisons, best practices and case studies applicable to the Tianjin Eco-City.

The BCA Academy of the built Environment organised a training programme for Zhejiang officials on planning and development of a sustainable built environment. The objective of the programme was to share with participants an overview of Singapore's efforts to plan and development a sustainable built environment in Singapore. This programme provided an insight into the processes involved in developing a green city.

BCA has signed the several Memoranda of Understanding (MOU) with various municipal government agencies and organisations in China to collaborate on building capacity for green buildings and sustainable developments. These collaborations include drafting of green building and district standards, training and exchanges, and collaborative showcase green building projects.

Conclusion

BCA has worked closely with various government agencies and private organisations to build its capacity and also contribute to capacity building efforts locally and to the region. And it has established itself as a key regional player for sustainable buildings solutions.

Capacity building programmes to various foreign delegations have provided us valuable experiences. Government officials from these countries have learnt about Singapore's governance, framework and processes for construction industry.

These programmes and initiatives provided an avenue for BCA to showcase to the region and the international fraternity its construction capabilities. Overall, BCA has helped built capacity and sustainability within its shores and regionally.

References

1. Building and Construction Authority. Retrieved 10 November 2011 from http://www.bca.gov.sg/
2. BCA Academy. Retrieved 12 November 2011 from https://www.bca.gov.sg/academy
3. BCA Pillars. Issue 02/2011
4. BCA build smart – A Construction Productivity Magazine. Issue Oct 2011