

BUILDING CONTROL - Singapore Experience

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ABSTRACT

This paper covers the Building and Construction Authority's (BCA) roles in developing and regulating the building construction industry in Singapore.

It includes the system of ensuring building safety such as structural plan checking by qualified Accredited Checkers, mandatory periodic inspection of existing buildings by qualified persons and quality control systems.

The pro-active roles played by BCA in helping the building industry to innovate and deliver high quality buildings and infrastructure by promoting cost-effective and productive methods are also highlighted. The various systems covered in the paper include the introduction of performance-based codes, construction quality assessment system (CONQUAS), and legislation on buildability score as a condition for plan approval to encourage buildable design using prefabrication construction method.

Finally, the paper covers proposed legislation to facilitate Design-and-Build (D & B) practice, various incentive schemes to promote R & D in the building industry and use of IT for submission and checking of plans such as e-Submission system and Construction & Real Estate Network (CORENET).

1.0 INTRODUCTION

The Building and Construction Authority (**BCA**) plays the primary role in developing and regulating Singapore's building and construction industry. Its mission is to **"to develop a technologically advanced and competitive construction industry which serves Singapore's economic needs."**

Hence, BCA plays a pro-active role in helping the building industry to deliver world class buildings and infrastructure with the most cost effective and productive methods.

2.0 ENSURING BUILDING SAFETY AND MAINTENANCE

As the Building Authority, BCA ensures that buildings in Singapore are designed and built to comply with high standards of safety.

2.1 Accredited Checker (AC) System

In the interest of public safety, BCA has established a stringent checking system which requires structural plans prepared by a qualified engineer to be checked and certified by an accredited checker before they are submitted to BCA for approval.

2.2 Mandatory Inspection of Existing Buildings

BCA also administers a system of periodical structural inspection of existing buildings to ensure that they are structurally sound for continued occupation. While commercial and industrial buildings have to be inspected by a qualified engineer once every five years, residential buildings have to be inspected once every ten years.

3.0 RAISING QUALITY AND PRODUCTIVITY IN BUILDING INDUSTRY

To deliver high quality buildings and infrastructure, various systems are established to improve quality and productivity.

3.1 Performance-based Codes

BCA is currently working on a framework, which will replace the existing prescriptive requirements in the regulations with a performance-based building code. The new framework will state clearly the objectives of the regulation. It will allow designers to explore innovative design solutions that can best meet their clients' needs.

3.2 **Construction Quality Assessment System (CONQUAS)**

The Construction Quality Assessment System (**CONQUAS**) is a scoring system introduced to assess the workmanship standard of contractors. It has been used to assess over 1,600 public and private sector projects. BCA is promoting its use in private residential projects.

3.3 **Legislation on Buildable Design**

BCA also aims to raise the construction industry productivity by promoting advanced construction technology and practices such as buildable design. The Buildable Design Appraisal System (**BDAS**) was introduced in 1991 to help architects and engineers assess the buildability score. To give the industry a much-needed further push, buildable design has been legislated since 1 January 2001 as a requirement for building plan approval. A minimum buildable score has to be achieved before building plan approval could be given. This will encourage designers and contractors to switch to more productive construction methods and technologies, such as modular and prefabricated building products.

3.4 **Building Energy Efficiency Programme**

BCA is a member of the National Energy Efficiency Committee. We have formulated a building energy efficiency master plan to enhance existing energy efficiency standards for building design and develop an energy efficiency management programme for the life span of the building. Energy audits of buildings are carried out to establish energy efficiency indices (**EEI**) for performance benchmarking. To promote energy efficiency, a new award, called the Energy Efficient Building Award (**EEBA**), has been launched.

3.5 **Construction Research & Development (R & D)**

In a move to promote research and development (R & D) within the construction industry, funds are available for R & D in buildability technology and construction

I.T. BCA also administers various incentive schemes such as Investment Allowance Scheme, the Local Enterprise Technical Assistance Scheme, the Innovation Development Scheme and the Initiatives in New Technologies Scheme.

4.0 IMPROVING INDUSTRY PROCUREMENT PRACTICES

To strengthen the industry procurement practices in Singapore, BCA has made some key initiatives such as promoting design-and-build (D & B) and established a revised Contractors Registry for public sector procurement.

4.1 Design-and-Build (D & B)

BCA has been actively promoting design-and-build (D & B) as an alternative to the more conventional design-bid-build procurement method. D & B encourages closer integration among the industry players at the design stage, resulting in less amendment downstream and enabling designs to incorporate upfront the issues on buildability, ease of maintenance and long term durability. The "Public Sector Standard Conditions of Contract" has been introduced for use in all public sector construction projects.

4.2 Contractors Registration System (CRS)

To support the procurement of construction services for the public sector, BCA shortlists consultants and registers contractors on behalf of the government. It maintains panels of consultants and Contractors Registry with a detailed database on their registration status, performance and track records. The registration requirements would be tightened in July 2002 to encourage companies to upgrade, grow stronger and compete for larger and complex job in the long run. There will be more stringent requirements on finance, personnel, track record and continual development capability. For example, for the top grade registration, the financial requirement in terms of paid-up capital will be raised from 5% to 10% of the tendering limit. The number of professional and technical staff will increase from 4 to 30. Firms are required to obtain ISO Quality Management System and OHSAS (Occupational Health and Safety) certifications by July 2004.

5.0 ENCOURAGING GREATER USE OF INFORMATION TECHNOLOGY (IT)

BCA plays a pivotal role in promoting the use of information technology (IT) to improve productivity in the industry. It spearheads the development of national IT standards for construction and also drives the “Construction and Real Estate Network” (**CORENET**) projects.

5.1 Construction and Real Estate Network (CORENET)

CORENET aims to re-engineer the business processes of the construction industry to achieve a quantum leap in quality, productivity and turnaround time. The government is investing S\$44 million to put in place the CORENET infrastructure. The e-Submission System, which enables online submissions to various regulatory agencies, was launched in Nov 2001. In addition, two automatic plan checking systems – the “Integrated Building Plan Checking System” and the “Integrated Building Services Checking System” – will also be developed and deployed in 2003.

6.0 CONCLUSION

The construction industry is a significant contributor to the Singapore’s economic development and GDP. However, it faces several challenges such as:

- Low productivity level and negative productivity growth;
- Dirty, dangerous and demanding working environment;
- Fragmented nature of the construction industry with little incentives for merger to tackle the issues on buildability, construction quality, safety, environmental performance, maintainability etc.

Hence, in October 1999, the Construction 21 (**C21**) blueprint was launched. It calls for a total systems approach to re-invent the construction industry. The blueprint is a concerted effort by government agencies and key players in the industry. It outlined 6 strategic thrusts that would propel the industry to one that is progressive, professional and productive. BCA was tasked to play the championing role in leading and facilitating the implementation of the recommendations of C21.