

IBS

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ESTABLISHMENT AND DEVELOPMENT OF IBS IN MALAYSIA

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BRIEF OVERVIEW

- Compared to other sectors, the construction industry suffers from **low productivity, safety and quality control**.
- **Traditional method of building process** brings all the workers, machineries, and materials to the ground where the building is to be constructed. It contributes to **inconsistent quality, prone to delays, substantial material waste, and dangerous working environment**.

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BRIEF OVERVIEW

- Due to the **traditional labour-intensive practices**, the **3-D Syndrome (Dirty, Difficult & Dangerous)** has always been associated with the construction industry.
- Thus, it **threatens the global competitiveness of Malaysian Construction Industry**.
- CIDB strongly supports the use of Industrialised Building Systems (IBS) in order to **reduce the dependency on foreign labour and increase productivity, quality and safety in the local construction industry**.

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INTRODUCTION

➤ The **most significant, feasible and practical definition of IBS in Malaysia** was introduced by the Construction Industry Development Board in Malaysia's Roadmap of IBS (CIDB, 2003), as a **construction technique** in which **components are manufactured in a controlled environment (on or off site), transported, positioned and assembled into a structure with minimal additional site works**.

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INTRODUCTION

- Based on the structural aspects of the systems, IBS can be divided into **five common types (CIDB, 2003)** :
 - ✓ **Precast Concrete System**
 - ✓ **Formwork System**
 - ✓ **Blockwork System**
 - ✓ **Steel Frame System**
 - ✓ **Timber Frame System**

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Precast Concrete System

- **Pre-cast Concrete Framing, Panel and Box systems:** Includes pre-cast concrete columns, beams, slabs, walls, "3-D" Components (Eg: balconies, staircases, toilets, lift chambers, refuse chambers etc.), lightweight pre-cast concrete, as well as permanent concrete formworks.



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Formwork System

Formwork Systems: Includes tunnel forms, beams and columns molding forms, permanent steel formworks, metal decks and etc.



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Blockwork System

Blockwork Systems: Includes interlocking concrete masonry units (CMU), lightweight concrete blocks and etc.



Steel Frame System

Steel Framing Systems: Covers steel trusses, steel columns and beams, portal frame systems, roof trusses and etc.



Timber Frame System

Timber Framing Systems: Pre-fabricated timber frames, beams and columns, roof trusses and etc.



What are the benefits for using IBS?

The main benefits are:

- Higher quality products** with **minimum wastages** due to factory-controlled prefabrication environment.
- Elimination of the timber formwork usage and great reduction of props** through the usage of prefabricated elements or system formwork for site casting.
- Faster completion** due to the introduction of prefabricated components replacing in-situ construction.
- Sturdy and safe work platforms** provided by the prefabricated elements.

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E. Minimum labour usage as bricklaying and plastering work is no longer used.

F. Less cost in overall construction budget due to all of the above.

What is the main purpose of introducing IBS in Malaysia?

- IBS helps to **reduce foreign labour** as well as to **increase quality and faster construction work**. Government intends to **generate IBS component manufacturing industry** which would be able to **contribute to the GDP**.

ADVANTAGES OF IBS

Achieving Higher Quality through careful selection of material, use of advanced technology and strict quality assurance control (Thanoon et al., 2003).

Faster Construction Time: Wisam (2005) asserted that faster completion of projects will be achieved due to advance off-site preparations and simplified installation process.

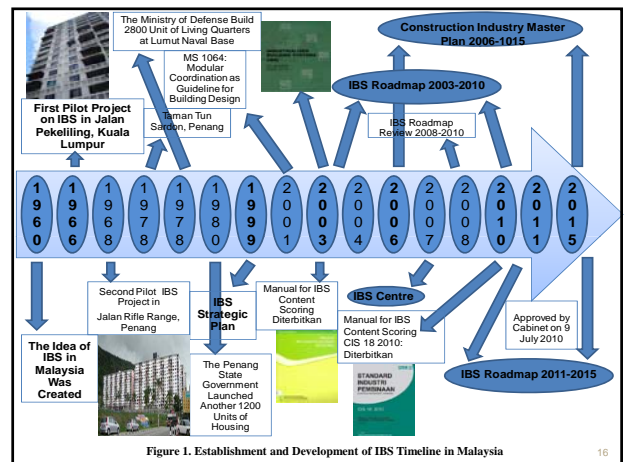
High Cost Saving: Control in using materials, such as: steel, sand, and timber will contribute in savings in material cost and savings in labor cost that will ultimately result in substantial savings on the overall cost of the project (Bing et al., 2001).

Increasing the Safety: Implementing IBS will promote safe and systematic factory working environment as minimal workers, materials and construction waste is required on-site (CIDB, 2003).

DISADVANTAGES OF IBS

Higher Initial Investment Cost: IBS requires high initial investment capital for pre-casters to purchase new machinery, mould, importing foreign technology and wages of skilled workers (IBS Steering Committee, 2006; Thanoon et al., 2003; Rahman & Omar, 2006).

The Industry is Uncompetitive Due to Lack of Open Collaboration: Contractors in Malaysia are obligate to close system and getting supply from the same manufacture throughout the construction (Chung & Kadir, 2007).



IBS IMPLEMENTATION: INDUSTRY RESPONSES

- Malaysia has seen **40 years of IBS planning and implementation**. Although the pace was slow during the late 1960s and 1970s, and the discontinued during the 1980s

Among significant projects that use IBS are:

- **2007** - Stormwater Management and Road Tunnel (SMART Tunnel), Kuala Lumpur, The Spring Shopping Mall, Kuching, Sarawak
- **2006** - Kuching International Airport, Kuching, Sarawak, Persada Johor International Convention Centre, Johor Bahru

- **2005** - Serdang Hospital, Serdang, Selangor, The Curve, Mutiara Damansara, Selangor
- **2001** - Kuala Lumpur Sentral (KL Sentral), Kuala Lumpur, Likas Stadium, Kota Kinabalu, Sabah
- **1998** - Kuala Lumpur International Airport (KLIA), Sepang, Selangor, Malawati Indoor Stadium, Shah Alam, Selangor
- **1997** - PETRONAS Twin Towers, Kuala Lumpur, Bukit Jalil Hockey Stadium, Bukit Jalil, Selangor
- **1978** - 1005 units of low-cost, five-storey walk up flats, Taman Tun Sardon, Gelugor, Pulau Pinang

- **1966- The first IBS building project in Jalan Pekeliling**, seven blocks of 17-storey flats (3,000 units of low-cost flat and 40 shops lot)

- **1968- The second IBS building project**, 6 blocks of 17-storey flats, 3 blocks of 18-storey flats and 66 units of shop houses, Jalan Rifle Range, Air Itam, Pulau Pinang

Other Projects Include:

Residential

1. 10,000 units of Teachers' Quarters, nationwide
2. **High-rise apartments in Putrajaya**
3. Apartments in Ampang, Kuala Lumpur and Puchong, Selangor
4. **CyberVilla Town House**, Cyberjaya, Selangor

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5. Pangsapuri Dahlia Akademi Audit Negara, Negeri Sembilan
6. Seremban II Township Project, Negeri Sembilan

Schools & Universities

1. Kolej Sains Kesihatan Bersekutu, Johor Bahru, Johor
2. **Lim Kok Wing University**, Cyberjaya, Selangor
3. Sekolah Rendah Kebangsaan Semambu, Kuantan, Pahang

Hospitals

1. **Hospital Universiti Kebangsaan Malaysia (HUKM)**, Cheras, KL
2. Kidney Dialysis Centre, Kuching, Sarawak

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Shopping Malls

1. **Mid Valley Megamall**, Kuala Lumpur
2. IKEA, Mutiara Damansara, Selangor
3. Jaya Jusco, Kepong, Kuala Lumpur
4. Jusco Tebrau City, Johor Bahru, Johor
5. MYDIN Hypermarket, Kuala Terengganu, Terengganu
6. **Carrefour Hypermarket**, Seberang Prai, Pulau Pinang

Factories & Warehouses

1. Pelikan Factory, Warehouse and Office, Puchong, Selangor
2. Distripark Warehouse, Westport, Pulau Indah, Selangor
3. Nippon Express Office and Warehouse, Pulau Pinang
4. Flextronics Factory Senai, Johor Bahru

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Apartment for Government Staff, Putrajaya (2008)

- **Function of Building: Apartment**
- Location: Parcel 8, Precinct 9, Putrajaya
- **IBS System: Precast concrete walls**
- Owner: Putrajaya Holding Sdn. Bhd.

Telekom Tower, Kuala Lumpur (2001)

- **Function of Building: Office**
- Location: Jalan Pantai Baru, Kuala Lumpur.
- **IBS System: Steel structure for the sky garden and top part of the building**
- Owner: Telekom Malaysia Bhd.

Serdang Hospital (2005)

- **Function of Building: Administration Building, Hospital**
- Location: Serdang, Selangor
- **IBS System: Steel beams and columns, precast concrete half slabs**
- Owner: Ministry of Health, Malaysia

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Kuala Lumpur International Airport (KLIA), Sepang (2001)

- **Function of Building: Airport Terminal Building**
- Location: Sepang, Selangor.
- **IBS System: Steel roof structure**
- Owner: Malaysia Airport Berhad.

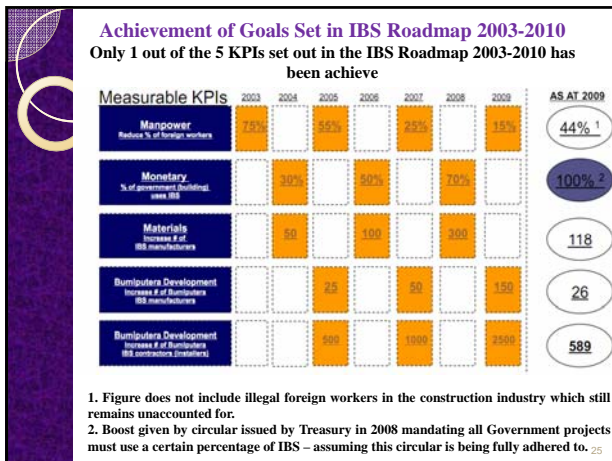
KL Sentral Station, Kuala Lumpur (1998)

- **Function of Building: Railway station, Commuter station, LRT station, KL Sentral – KLIA Airport Rail Station, Shopping Complex, Monorail Station**
- Location: Brickfields, Kuala Lumpur
- **IBS System: Steel roof structure, precast hollow core slabs.**
- Owner: Kuala Lumpur Sentral Sdn. Bhd.

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- One of the main objectives of the roadmap is to introduce **Open Building System (OBS) concept by the year 2010.**
- The IBS Roadmap 2003-2010 was introduced **to cater to the needs of the Malaysian construction industry**, emphasising the use of IBS and to provide the industry with a fundamental plan that involves all the important aspects in this evolution process. The IBS roadmap was **formulated based on the 5-M strategy of; Manpower, Materials, Management, Monetary and Marketing (5M)** which reflects the inputs needed to drive the programme and as a reference for all parties in implementing all programs **towards the modernization and industrialization of the Malaysian construction sector (IBS Roadmap, 2003).**

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➤ The new IBS Roadmap 2011-2015 is developed by CIDB under consultation with the industry players to chart the way forward for IBS industry.

➤ The main goals for this IBS Roadmap 2011-2015 were encapsulated below:

1. To sustain the existing momentum of 70% IBS content for public sector building projects through to 2015.
2. To increase the existing IBS content to 50% for private sector building projects by 2015.

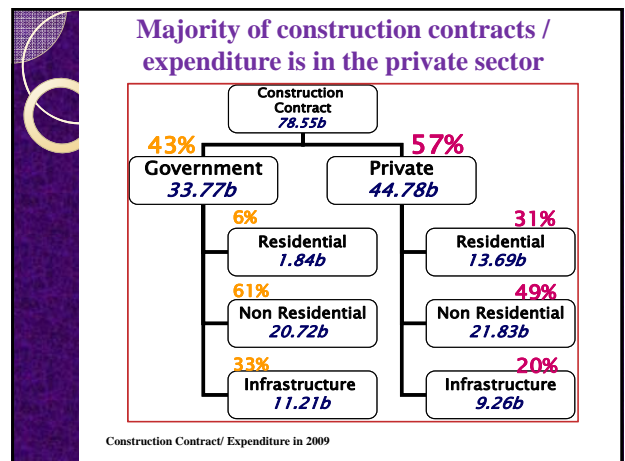
IBS ROADMAP 2011-2015

IBS Roadmap 2011-2015

MISSION: TO PROVIDE A QUALITY, EFFICIENT, COMPETENT & SUSTAINABLE (FOUR VPOLICY OBJECTIVES) IBS INDUSTRY THAT CONTRIBUTES TO THE COMPETITIVENESS OF MALAYSIA'S CONSTRUCTION SECTOR

- Quality** (checkmark icon): Good quality designs, components and buildings are the desired outcome of IBS. Aesthetics should be promoted through innovation.
- Delivery Efficiency** (clock icon): To ensure that by using IBS, completion time of a building is speedier, more predictable and well-managed.
- Competency & Productivity** (worker icon): To have a ready pool of competent IBS professionals and workers throughout the entire project life-cycle: from design, manufacture, build to maintain.
- Financial Sustainability** (dollar sign icon): To create a financially sustainable IBS industry that balances user affordability and manufacturer viability.

➤ The private sector accounts for 57% of the total project value carried out by the entire construction industry. To achieve an overall industrialised construction industry, the buy-in of the private sector is equally important. Residential projects such as flats, condominium and terrace houses have high IBS potential due to its repetitive nature of production. The private sector built RM13.6b worth of residential projects, compared to only RM1.8b by the public sector. Based on average from 2000 to 2009



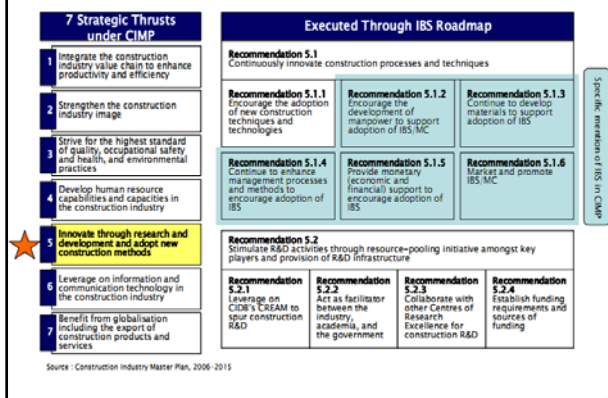
- The CIMP has identified eight (8) Critical Success Factors (CSF), (productivity, quality, human resource, knowledge, innovation, environment-friendly practices, industry sustainability and professionalism) which are imperative to the success of the achievement of the strategic thrust and strategies and ultimately to the vision of the Construction Industry.
- In order to achieve the vision and mission, seven (7) strategic thrusts (ST) are :
 - Integrate the construction industry value chain to enhance productivity and efficiency;
 - Strengthen the construction industry image;

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- Strive for the highest standard of quality, occupational safety and health and environment practices;
 - Develop human resource capabilities and capacities in the construction industry;
 - Innovate through research and develop and adopt new construction methods;
 - Leverage on information and communication technology (ICT) in the construction industry; and
 - Benefit from globalization including the export of construction products and services.
- 21 specific recommendations, 77 action plans and 384 activities have also been developed and to be undertaken in order to achieve these Strategic Thrusts.

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Construction Industry Master Plan (CIMP)



THE IBS CONTENT SCORING SYSTEM

- The maximum IBS Score for a building is 100 points.
- The IBS Score is made up of the following components:
 - Structural Systems (Maximum score is 50 points)
 - Points are awarded for various types of structural system used, e.g. precast concrete beams and columns, steel, prefabricated timber, etc.
 - Wall Systems (Maximum score is 30 points)
 - Points are awarded based on various types of wall systems used e.g. precast concrete panel, glass, dry partition, block work, etc.
 - Other Simplified Construction Solutions (other modular applications, Maximum score is 20 points)
 - Points are awarded based on usage of other simplified construction solutions e.g. standard components based on MS 1064, standardised grids, other 3D prefabricated components such as prefabricated toilets, staircases, etc.

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IBS CENTRE

What is the role of IBS Centre?

- To realise the government's aspiration to transform the Malaysian construction industry into a modern construction system, The IBS Centre was set up in January 2007 as a One-Stop-Centre especially in assisting IBS related issues involving government's projects.
- The IBS Center has 5 elementary tasks; Industry Planning, Promotion and Marketing, Verification and Certification, Training and Technology Development.

What type of courses is offered by the IBS Centre?

- The IBS Centre offers 7 professional training courses:
 - Module IBS01 : Introduction to IBS and MC
 - Module IBS02 : IBS Score Calculation and Submission
 - Module IBS03 : Precast Concrete Project Planning and Execution
 - Module IBS04 : Analysis and Design – Precast Concrete Structures
 - Module IBS05 : Analysis and Design – Steel frame Structures
 - Module IBS06 : Modular Coordination Design
 - Module IBS07 : Procurement and Contract Administration.

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- The IBS Center has published the Orange Book, which is a directory of manufacturers, installers and consultants of IBS, registered with CIDB. Only companies listed in the IBS Manufacturers/Distributors/Suppliers and On-site Manufacturers Directory (Orange Book) will be considered for government projects. The orange book is used to promote the listed companies as certified IBS manufacturers.

IBS Centre Facilities

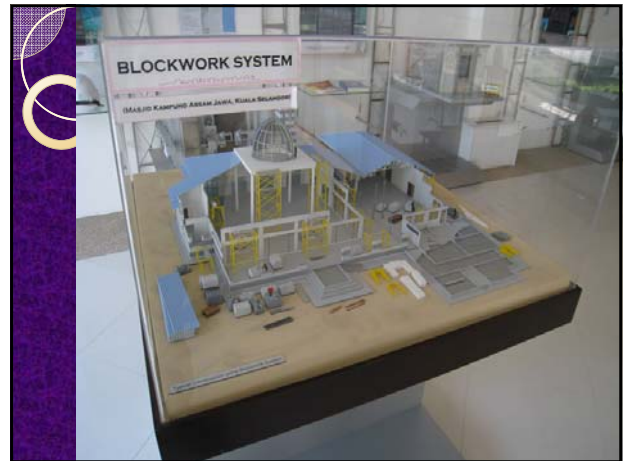
1. IBS Info Gallery

- The opening of IBS Gallery was officiated by Y.B Dato' Ir. Mohd Zin Mohamed, the Minister of Work Malaysia on 15 October 2008. The gallery is located on the Ground Floor of IBS Centre Office at Block E, Jalan Chan Sow Lin, Kuala Lumpur. It offers various information on IBS in the form of educational posters, printed publications, multimedia publications, models of IBS Buildings and samples of products.

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IBS INFO GALLERY

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IBS COMPONENT GALLERY

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MANUFACTURERS FOR:

Blockwork System

- Zenbes Sdn Bhd
- CSR Building Materials (M) Sdn Bhd

Formwork System

- MFE Formwork Technology Sdn Bhd
- Transkon Sdn Bhd
- EFCO (M) Sdn Bhd
- SBG Asia Pacific (M) Sdn Bhd
- Plastech Industrial System Sdn Bhd

Timber Framing System

- Pryda (M) Sdn Bhd
- GD Heritage Sdn Bhd

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Precast Component System

- He-Con Sdn Bhd
- Setia Precast Sdn Bhd
- Precast Product Sdn Bhd
- PJDCP Malta Sdn Bhd
- Eastern Pretech (Malaysia) Sdn Bhd
- MTD ACPI Engineering Sdn Bhd

Steel Frame System

- UAC Steel System Sdn Bhd
- BlueScope Lysaght (M) Sdn Bhd
- Brickwell Engineering Sdn Bhd

Other Prefabricated Components

- DK Composites Sdn Bhd
- UAC Berhad
- Hume Cemboard Industries Sdn Bhd
- Duralite (M) Sdn Bhd
- EVG Regional Office Sea
- Cycle World Corporation Sdn Bhd
- Southern Steel Solution Sdn Bhd

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BLOCKWORK SYSTEM

- LIGHTWEIGHT CONCRETE BLOCK



BLOCKWORK SYSTEM



FORMWORK SYSTEM

- METAL FORMWORK
- PLASTIC FORMWORK



PLASTIC FORMWORK



TIMBER FRAMING SYSTEM

- DOOR TIMBER
- TIMBER FRAMING SYSTEM




TIMBER PANEL

- TIMBER PANEL
- TIMBER ROOF TRUSS



PECAST COMPONENTSYSTEM

- PRECAST SYSTEM
- Hollow Core Slab, Column and Beam



PRECAST STAIRCASE

- PRECAST STAIRCASE
- PRECAST HALF SLAB



PRECAST WALL PANEL

- PRECAST WALL PANEL
- PRECAST SLAB FOR TOILET



COLUMN, BEAM AND WALL PANEL

- COLUMN, BEAM AND WALL PANEL



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STEEL FRAME SYSTEM



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STEEL ROOF TRUSS



OTHER PREFABRICATED COMPONENTS

• SANDWICH PANEL (BUILT IN 8 DAYS)

- SOLID WALL (IS VERSATILE IN COMPLYING TO THE FIRE-RATING, SOUND INSULATION, WET APPLICATION, IMPACT STRENGTH AND ROBUSTNESS REQUIREMENTS)



• TOLIET POD



• WALL PANEL



IBS SHOW VILLAGE

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APARTMENT

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TRESS

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HYBRID HOUSE

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CONCLUSION

- ❖ Industrialised Building Systems (IBS) is a construction process that utilizes **techniques, products, components, or building systems.**
- ❖ Successful and effective implementation of IBS in Malaysia construction industry can offer **various benefits compare to conventional in-situ systems.**
- ❖ These benefits are very important aspects in **achieving the efficient and effective construction industry** which will **enhance the market share of construction industry** as well as **contributing to the Malaysian economy.**

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- ❖ The **government** has done a lot of efforts to enhance the **current conventional, labor-intensive** activities to a **more technologically advanced method of construction.**

- ❖ The **government** had efforts to put Malaysia construction industry in **producing fast, cost effective and high quality construction products.**

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