

ISSUES AND CHALLENGES IN SUSTAINABLE CONSTRUCTION IN THE BUILT ENVIRONMENT: MALAYSIAN CONSTRUCTION INDUSTRY INITIATIVES

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ABSTRACT

Sustainable Development is a global political vision launched by the World Commission on Environment and Development and manifested at the United Nation Conference on Environment and Development (CIB, 2002). The construction industry and its related activities are responsible for a substantial amount of global resource use and waste emissions. The combination of effort from sustainable and built environment and all actions derived from construction will protect the earth from manmade disaster. Construction sector could not be marginalized from the issues on environment. Creating a sustainable construction in Malaysia requires a strategic approach that will benefit the country's current and future consideration looking issues related to economic, social, environment and quality of life. Construction Industry Development Board (CIDB) Malaysia is obliged to take this issue on board through its Construction Industry Master Plan initiatives under Strategic Thrust 3: Strive for the highest standard of quality, occupational safety and health and environmental practices. This paper discusses the role played by CIDB Malaysia to set out an agenda and a strategy for action to attain current and future sustainable construction in the built environment.

Keywords: *construction industry, built environment, strategic, sustainable, challenges, way forward*

1.0 INTRODUCTION

The manifestation of sustainable and built environment is generally associated with one another. Sustainable Development is a global political vision launched by the World Commission on Environment and Development and manifested at the United Nation Conference on Environment and Development (CIB, 2002). Built Environment on the other hand is a broad concept encompassing man-made artifacts and space at all levels from single items to urban regions (Chalmers Architecture, 2008). The combination of effort from sustainable and built environment and all actions derived from construction will protect the earth from manmade disaster. The world is at a crossroads between the old path of development at the price of environmental degradation and a new one combining growth with sustainability (Newsweek, July, 2008). In the scale of maximum score of 100 the Environmental Performance Index (EPI) aims to be a comprehensive assessment of the world's environmental challenges and how individual countries are responding to them. Switzerland and Sweden are the world's green leaders while Malaysia positioned 26th. in the ranking sharing with Denmark (Newsweek, July, 2008). This indicates that we as Malaysian are concerned of the environment.

The construction industry generates impetus to the Malaysian economy. For many years it has created important roles in improving the quality of life for Malaysian through multiplier effects to other industries. In this respect, physical development solely would not give the guarantee to pursue the quality of life for future generations. It must also be able to develop and utilize resources with most effectively and competitively and sustainably economy. This paper discusses the role played by CIDB Malaysia to set out an agenda and a strategy for action to attain current

and future sustainability environment. The policy set by the government, R&D innovation, the domestic skills development and construction capability, are all fundamental to the infrastructure that will consolidate and drive the nation's economy forward.

2.0 GLOBAL CHALLENGES ON BUILDING SUSTAINABLE BUILT ENVIRONMENT

There are some of emerging issues on built environment that has been addressed in the *Agenda 21 for Sustainable Construction in Developing Countries* (CIB, 2002; Ministry of Environment, 2007). Environment encompasses physical and non physical medium such as air, water, solid waste/land and also noise pollution. Construction sector could not be put aside from the issues on environment. The construction with exploitation of natural resources such as forest for timber, housing and industry without proper control contributes to the environmental problems (Ibrahim, 1999). Many of environmental issues that occur in our country are due to lack of environmental considerations in the exploitation, development and management of resources as well as lack of control of pollution resources. These issues if not tackled strategically will further aggravate and exert challenges towards sustainable construction in the following way.

- i) Major concern challenges on sustainable construction are the mobilization of resources in order to support research, technological changes and feasibility studies. The sharing of research and educational activities must be taken on board right from government, universities and other private sector related industries,
- ii) Environmental issues on construction are becoming more complex. The pursuance of environmental protection must be balance with the need for economic development,
- iii) The use of environmentally appropriate technologies with concern on energy efficiency and full commitment to waste recycling and pollution should be practiced by construction players,
- iv) Emphasis also must be given to the integration of environmental in all project planning and implementation. In this respect, usage and application of information, communication and technology (ICT) in leveraging skills should be introduced to the construction players,
- iv) Construction also has to reduce usage of its resources through material consumption, construction costs and wastage rates (CIB, 2002). It can be successful being done by way of education, site planning, management and design practices and adoption of new technologies,
- vi) In global environmental sustainability, there is need for construction players to leverage socio-economic through equitability which stipulated in Kyoto Protocol which requires a substantial reduction in greenhouse gas emissions (CIB, 2002).
- v) Improving the quality of the construction process and its products. A first step towards sustainable construction is to improve the quality of construction products and the efficiency and safety of the construction process.

In adopting sustainable construction in Malaysia, industry players need to take a holistic approach along the entire activities in the construction value chain in performing their duties. Wider

spectrum coverage within construction fraternity itself including societies, workers must work together towards sustainable construction in future.

There are a lot of rooms for improvement in the Malaysian environment scene at large. In Sweden the current Government is focusing to build sustainable communities by looking at four strategic challenges which include the followings.

- i) Balancing various interests in terms of physical planning, regional development and infrastructure, along with residential and city planning consistent with sustainable urban development. An overall challenge, both nationally and globally, is posed by demographic change as the result of migration, an ageing population, urbanisation (particularly in the metropolitan areas) and depopulation trends in most Swedish municipalities (Ministry of Sustainable Development, 2006).
- ii) Encouraging good health on equal terms requires laying the foundation for decent living conditions – access to gainful employment, decent workplaces, economic and social security, communities in which children can grow up safely, participation and codetermination.
- iii) Prioritising broad-based initiatives aimed at eliminating health and mortality discrepancies among various social and economic groups. A clean environment and healthy lifestyles are also vital to improve public health that facilitates both national economic growth and more stable household finances.
- iv) Encouraging sustainable growth implying economic expansion driven by dynamic markets, a forward-looking welfare policy and a progressive environmental policy. The Government's vision is for Sweden to eventually obtain its entire energy supply from renewable sources. (Ministry of Sustainable Development, 2006).

In Sweden the national environmental quality objective “A Good Built Environment” works in the direction of more recycling of materials. Issues on 3R (reduce, reuse and recycle) can be seen as a way forward for construction industry to move up in achieving sustainable development on the various environmental, social, economic and even cultural factors. In addressing these issues on construction and environment, efforts towards sustainable construction must be taken on board to restore between natural and built environments (*Tse, 2001, Shen and Tam, 2002*).

3.0 ISSUES AND CHALLENGES IN MALAYSIAN CONSTRUCTION

In a developing country like Malaysia, the sustainable construction trend tends to focus on relationship between construction and human development and marginalizing environmental aspects. However, in light of the severe environmental degradation experienced by most of the developing countries, construction industry cannot continue to ignore the environment (*Begum, 2005*).

3.1 Construction Waste Scenario in Malaysia

Construction waste issue also has recently received greater attention in the country. The amount of waste generated gradually increase in response to the rapid growing population, urbanization and industrialisation (*World Bank, 1999*). The hindrance of the implementation is that the contractor does not practice source separation, source reduction, reusing and recycling in

construction site and disposed their waste into landfill. In the Malaysian context there is still lack of basic legislation and clear policies on construction waste management.

3.2 Challenges on Built Environment

Environment encompasses physical and non physical medium such as air, water, solid waste/land and also noise pollution. The loss of the original topsoil and vegetation removes a valuable filtering mechanism for stormwater runoff. (Hassan, 2008). In 2006, more than six million tones has been generated which quarter was produced in the Klang Valley alone, the most affluent area in Malaysia (Yusoff, 2007). Today, solid waste issue is one of the biggest environmental problems in Malaysia (Hassan, 1991 and Nasir *et al.*, 1995).

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4.0 INITIATIVES ON GREEN'S STRATEGIES IMPLEMENTATION IN MALAYSIA

In global environmental sustainability, there is need for construction players to leverage socio-economic through equitability which stipulated in Kyoto Protocol which requires a substantial reduction in greenhouse gas emissions (*CIB, 2002*). Given the legacy of greenhouse gas emissions and rising global energy consumption, further warming is unavoidable. Mitigation measures to reduce the extent of global warming are crucial. The Kyoto Protocol, the first international agreement on tackling climate change-stipulates that industrialised countries, historically responsible for most emissions to date, must act first to curb emissions, giving time for developing countries to grow their economies and raise their peoples' living standards. Many people are reluctant to invest in energy efficiency and solar technologies to build sustainable building due to the higher investment cost.

Government policies have been recognised as important instruments in driving the market for sustainable buildings. In Malaysia, there is currently no policy which mandates a sustainable building; the closest we have is the MS 1525:2007 which is the 'Code of Practice on Energy Efficiency and the Use of Renewable Energy for Non Residential Buildings (*Ooi, S., 2007*).

5.0 NATIONAL ENVIRONMENT POLICY

The National Environment Policy launched by Ministry of Science Technology and Environment (MOSTE) in 2002 aimed to continue economic, social and cultural progress of Malaysia and enhancement of the quality of life of its people, through environmentally sound and sustainable development (*MOSTE, 2002*). The objectives of the Policy are firstly to achieve a clean, safe, healthy and productive environment for present and future generations. The second objective is conservation of the country's unique and diverse cultural and natural heritage with effective participation by all sectors of society and lastly sustainable lifestyles and patterns of consumption and production (*MOSTE, 2002*).

The National Policy on Environment (*MOSTE, 2002*) is based on the following eight principles that harmonize economic development goals with environmental imperatives.

- (i) *Stewardship of the environment*
Exercise respect and care for the environment in accordance with the highest moral and ethical standards.
- (ii) *Conservation of nature's vitality and diversity*
Conserve natural ecosystems to ensure integrity of biodiversity and life support systems.
- (iii) *Continuous improvement in the quality of the environment*
Ensure continuous improvement in productivity and quality of the environment while pursuing economic growth and human development objectives.
- (iv) *Sustainable use of natural resources*
Manage natural resource utilization, to sustain the resource utilization, to sustain the resource base and prevent degradation of environment.
- (v) *Integrated decision-making*
Integrate environmental dimensions in the planning and implementation of the policies, objectives and mandates of all sectors to protect the environment.
- (vi) *Role of the private sector*
Strengthen the role of the private sector in environmental protection and management.
- (vii) *Commitment and accountability*
Ensure the highest commitment to environmental protection and accountability by all decision-makers in the public and private sectors, resource users, non-governmental organizations (NGOs) and the general public, in formulating, planning and implementing their activities.
- (viii) *Active participation in the international community*
Participate actively and effectively in regional and global efforts towards environmental conservation and enhancement.

5.1 The Way Forward on Malaysia's Green Strategies

The National Policy on Environment seeks to integrate environment considerations into development activities and in all related decision-making processes, to foster long-term economic growth and human development and to protect and enhance the environment. The integrated considerations will lead to drive the Malaysia's Green Strategies towards the following seven key areas (*MOSTE, 2002; CIB, 2002*):

- i) *Education and awareness*
Inline with the recommendations of Agenda 21 (*CIB, 2002*), a deeper and better understanding of the concepts of environmentally sound and sustainable development, and caring attitude towards nature, environmental education and awareness will be promoted across the board, in comprehensive formal and informal environmental education and training strategies and information dissemination programmes will be devised and introduced.

- ii) *Effective Management of Natural Resources and the Environment*
The strategic area on effective management of natural resources and the environment are to protect and conserve the environment and natural resources to meet the needs and aspirations of the country's population, particularly with regard to the productive capacity of resources such as land, forests and biodiversity and water.
- iii) *Integrated Development Planning and Implementation*
Environmental considerations will be integrated into all stages of development, programme planning and implementation and all aspects of policy making. Environmental inputs shall be incorporated into economic development planning activities, including regional plan, master plans, structure and local plan (MOSTE, 2002).
- iv) *Prevention and Control of Pollution and Environmental Degradation*
Pollution and other adverse environmental impacts arising from development activities shall be minimised. Environmental quality monitoring surveillance programmes and environmental auditing systems will be expanded and strengthened to support enforcement programmes, planning and zoning and to enable a comprehensive and regular assessment of the state of environment. Within this context, CIDB has embarked programmes related to ISO 14001 certification focusing at construction companies that involved in larger projects which require Environmental Impact Assessment (EIA) (CIDB, 2007a). CIDB has also introduced the Environmental Management System (EMS) D.I.Y. Schemes. The aim of this CIDB EMS D.I.Y. Scheme is to facilitate contractors in upgrading their environmental management performance.
- v. *Strengthening Administrative and Institutional Mechanisms*
Integrated and effective cooperation and coordination among government and other sectors shall be enhanced in order to achieve efficient environmental management and protection. Environment-related legislation and standards shall be reviewed regularly and revised where necessary to ensure the continued effectiveness and coordination of laws. Particular attention will be paid to effective enforcement.
- vi. *Proactive Approach to Regional and Global Environmental Issues*
Malaysia will corporate actively with other countries, particularly the ASEAN community of nations, and with relevant regional and international organisations, on global environmental concerns. In other word, Malaysia will adopt a proactive approach in addressing global environmental issues such as the depletion of the ozone layer, climate change, trans-boundary pollution, hazardous chemicals and toxic waste management, marine quality and resource conservation and trade in endangered species.
- vii) *Formulation and Implementation of Action Plans*
Action plans, with adequate resource support for their implementation, will be formulated.

6.0 CONSTRUCTION INDUSTRY MASTER PLAN 2006-2015 (CIMP) INITIATIVES

The recently launched Construction Industry Master Plan 2006-2015 (CIMP) has identified the future challenges on environmental aspect as mentioned in Strategic Thrust 3: Towards highest standard of quality, occupational safety and health and environmental practices. The demand on environmental sustainability is necessary to achieve and sustain economic growth and social

development (CIDB, 2007a). A systematic effort is required to avoid undesirable environmental impacts and enhance ecosystem management. Among the major impacts associated with the industry are soil erosion and sedimentation, flash floods, destruction of vegetation, dust pollution, depletion of natural resources and the usage of building materials which are harmful to the human health.

Table 1: Strategic Thrust 3 – Strive for the Highest Standard of Quality, Occupational Safety and Health and Environmental Practices (CIDB, 2007a)

No.	Action Plan	Programme
1	Foster a quality and environment-friendly culture	The need to increase customer demand in the global environment in construction. Necessary to achieve and sustain economic growth and social development.
1.1	Encourage external accreditation in quality and environmental management. <ul style="list-style-type: none"> • Incorporate ISO certification requirements as part of the contractors registration scheme (G7 and G8) • Organise communication plan to promote ISO certification 	CIDB will play actively in participation local construction companies to attain ISO 9001 and ISO 14001 certifications.
1.2	Promote environment-friendly practices. <ul style="list-style-type: none"> • Recommend to the Ministry of Housing and Local Government to develop guidelines on stage construction • Propose to DOE to review conditional approval provision for EIA reports. • Enforce Tree Preservation Order (Act 1972). • Encourage “Green Reporting” by public listed companies • Introduce tax incentives for the adoption of ISO 14001 	Initiatives of “Green Building Material” will be promoted to ensure impact activities can provide in order to spur economy and social benefits at large. Urgent need of self-regulation within construction industry as a minimum necessary to achieve performance required.

The envisioned of Malaysian Construction Industry Master Plan 2006-2015 (CIMP) is to be a progressive construction sector that lies on sustainable development. **Figure 1** shows the overall strategic thrusts in CIMP, its critical success factor (CSF) as well as its enabling recommendations.

The importance of standard of quality, occupational safety and health and environmental practices to foster a quality and environmentally culture among construction industry players as outlined in the Strategic Thrust 3 is depicted in **Table 1**. The table summarises some action plan and also the continuous programme to be planned to promote quality and environmentally culture among construction stakeholders. CIMP envisaged that sustainable on construction is vital to the construction players to achieve and sustain economic growth and social development (CIDB, 2007a).

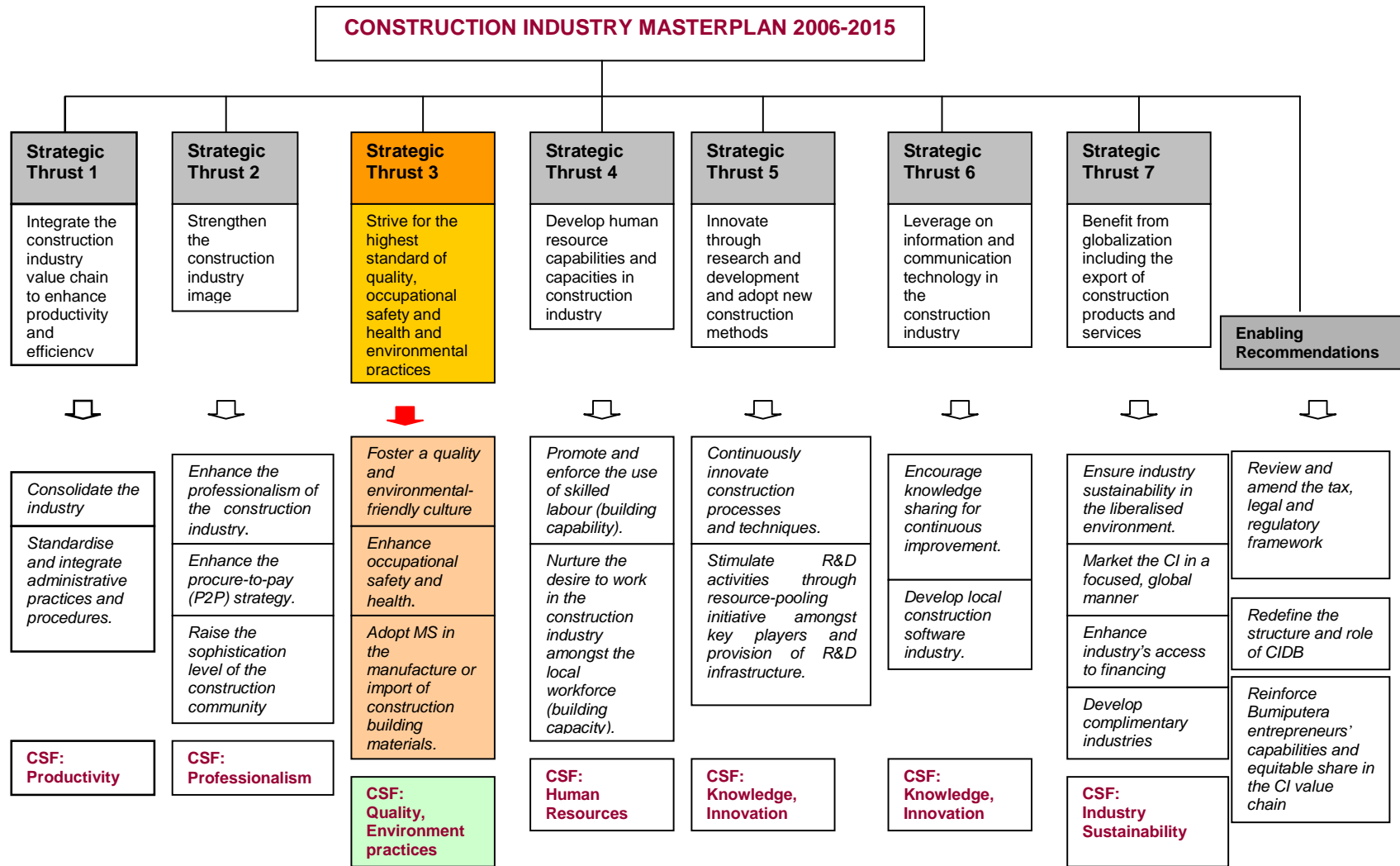


Figure 1: Construction Industry Master Plan 2006-2015 (CIMP) Initiatives (CIDB, 2007a)

7.0 IMPLEMENTING STRATEGIES ON SUSTAINABLE DEVELOPMENT: CIDB'S INITIATIVES

The sustainable development requires a balance between economic growth, social expansion and environmental protection. In order to pursue sustainable development, the construction industry itself has to be sustainable and give emphasis to environmental matter in addition to economic gains and social obligations.

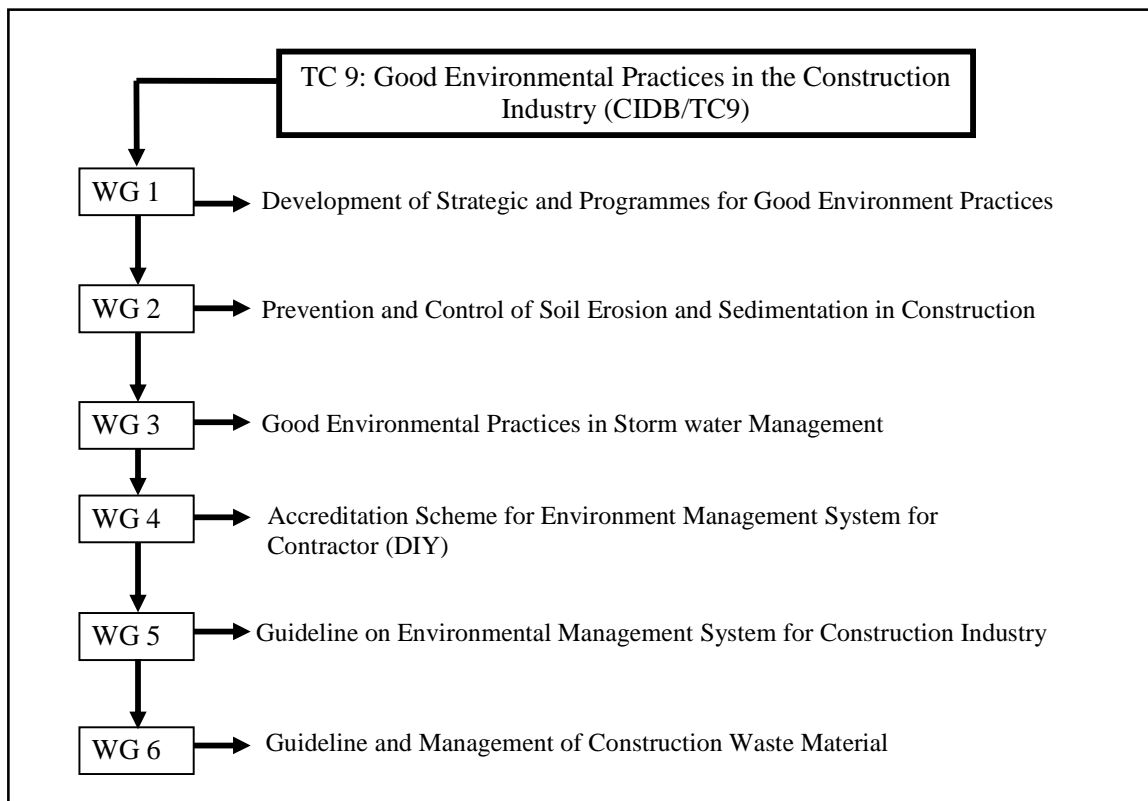


Figure 2: Strategic Recommendation Working Group under Technical Committee 9 (CIDB/TC9)

In 1999 CIDB had established a Technical Committee to look into developing good environmental practices in the construction industry. Technical Committee 9 on Good Environmental Practices in the Construction Industry (CIDB/TC9) comprises environmental experts from government agencies, professional bodies, academia and construction related associations.

The role of CIDB/TC9 is to develop standards to improve environmental in the construction industry and advise CIDB in the formulation of programmes to promote good environmental practices. The term of reference of TC9 is to identify, prepare and develop the Construction Industry Standard (CIS) and Good Environmental Practices in Construction Industry. CIDB/TC9 executes its mandate through the establishment of Working Group (WG). **Figure 2** shows the strategic recommendation working group under CIDB / TC9.

7.1 Strategic Output from the Working Group

CIDB has published various document on sustainable development, though some are still in the pipeline. Document on guidelines and good environment practices are made available and for immediate consumption by the stakeholders. Some of the document is developed through R&D while some are prepared by the respective Working Groups.

The list of expected output from several Working Groups established is highlighted below.

- i. Working Group 1: Development of Strategic and Programmes for Good Environment Practices,
- ii. Working Group 2: Best Practices on Prevention and Control of Soil Erosion and Sedimentation in Construction,
- iii. Working Group 3: Good Environmental Practices in Storm Water Management aim to prepare guideline to compliment the requirement of Manual Saliran Mesra Alam (MASMA),
- iv. Working Group 4: focusing on Accreditation Scheme for Environment Management System for Contractor under D.I.Y Scheme. This accreditation scheme is toward the contractor's certification to ISO 14001 on Environmental Management Systems,
- v. Working Group 5: Guideline on Environmental Management System for Construction Industry (EMSCI). This guideline aims to assist contractors to be ISO 14001 certified and that look into the proper environment management systems in the construction industry,
- v. Working Group 6: Training module on Waste Management at Construction Sites and Guideline on Good Practices in Construction Waste Management. The module is targeted to highlight project exemplars and provide insights on site practical practices on waste management.

8.0 RESEARCH AND DEVELOPMENT INITIATIVES

Currently there are six research projects on Environment and Sustainability managed by Construction Research Institute of Malaysia (CREAM), a research arm of CIDB. The research topics are as follows:

- i. Construction Practices for Storm Water Management and Soil Erosion Control for the Construction Industry,
- ii. Achieving Sustainability of the Construction Industry via International Environmental Management Systems Standard, ISO 14001,
- iii. Waste Minimisation and Recycling Potential of Construction Materials,
- iv. Materials Security And Waste Management for Industrialised Building Systems (IBS): Towards Sustainable Construction,

- v. Environmental Management Plan in the Contract Tender Document of Construction Projects and
- vi. Utilisation of Waste Materials for the Production of Concrete Pedestrian Block (CPB).

Research on Construction Practices for Storm Water Management and Soil Erosion Control for the Construction Industry are focusing towards developing good practices in these areas. Data and output from this project are being used in the various Working Groups for further development and some of the findings have been disseminated to the stakeholders via seminars and workshops.

Achieving Sustainability of the Construction Industry via International Environmental Management Systems Standard, ISO 14001 is aligned to prepare the Guideline on Environmental Management System for Construction Industry (EMSCI). This guideline is prepared and aimed to assist contractors to be ISO 14001 certified and looking into the proper environment management systems in the construction industry.

Research on Waste Minimization and Recycling Potential of Construction Materials has been completed in 2005 and handed over to the Technical Committee (TC) 9 under CIDB. Some of the document have been published and disseminate to industry players. TC9 is in the midst of consolidating the research output and will assign Working Group 6 to assist CIDB to prepare Guideline and Training Modules on Good Practices on Waste Management at Construction Sites.

Three other research namely Environmental Management Plan in the Contract Tender Document of Construction Projects, Materials Security and Waste Management for Industrialized Building Systems (IBS): Towards Sustainable Construction and Utilization of waste materials for the production of concrete pedestrian block (CPB) are still on going. These three projects are scheduled to be completed in 2008, 2009 and 2010 respectively. Upon completion, stakeholders are able to capture some of the local experiences as well as global practices on waste management and sustainable construction through lesson learned and technology transfer of best practices.

9.0 STRATEGIC RECOMMENDATIONS

The task to uphold sustainable construction in Malaysia is an enormous undertaking that require plenty of innovation and commitment from all concerned. Both through CIDB's initiatives, R&D initiatives and other action oriented strategies have identified tasks for immediate attention, as well as tasks for the medium and long term. It is vital that the strategic implementation plan continues to develop tools and technologies and other enablers to lessen the impact on environment and lead the Malaysian construction to be sustainable.

The commitment from stakeholders, government authorities and legislators can transform the Malaysian construction industry into one that is not threat to the environment, but meeting the human need for development in harmony with the nature. The combination of CIDB's initiatives and strategies documented in *Strategic Recommendations for Improving Environmental Practices in Construction Industry (CIDB, 2007b)* are recommended to be the strategic way forward to be adopted by all players. The strategies identified are summarized as follows:

- (i) Strengthening the Development Approval Process,
- (ii) Enhancing Law and Enforcement,

(iii) Promoting Self-Regulation, reflecting the best regulatory practices which is necessary to achieve sustainable construction in future,

(iv) Increasing Capacity and Public Awareness and

(iv) Addressing Knowledge Gaps.

The strategic direction, the implementation strategies and R&D participation have to be driven in congruent to ensure continuity and focused. It is envisioned that all initiatives needs to be taken forward simultaneously at both the local and international level.

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