

EXECUTIVE SUMMARY

BACKGROUND

Small and medium sized enterprises (SMEs) in Hong Kong's construction sector are collectively a major part of the economy ranking high in terms of number of establishments, contribution to gross domestic product, and size of employment. Construction sector SMEs, however, also account for substantial environmental concerns, such as air, water and noise pollution, energy consumption, waste generation and chemical waste production, compared to other sectors.

This *Review Report* has been compiled by the Business Environment Council Ltd for the Environmental Protection Department (EPD) through internet research, literature reviews and questionnaire surveys of stakeholder organizations to identify:

- latest trends in supply chain pressure for environmental management and EMS in the construction sector;
- specific environmental requirements of key client organizations, contractors and authorities (government works and related departments, private developers, utility companies, and main contractors); and
- organizations providing tailored support to local SME construction enterprises.

Findings are summarised as follows.

CONSTRUCTION SECTOR CHARACTERISTICS

The construction industry in Hong Kong is characterised by its large number of sub-contractors with numerous specialist operators, often using short-term labour, typically supporting larger main contractors. The industry is highly competitive and works to tight deadlines. Completion on time is a high priority, whilst resources such as space on site for recycling remain limited. However, there are sources of supply chain pressure for environmental improvement and these can be classified into a hierarchy of four levels:

Level 1	from stakeholders such as the <i>Construction Industry Review Committee (CIRC)</i> and <i>Provisional Construction Industry Coordination Board (PCICB)</i>
Level 2	from policies, legislation and regulations promulgated by Government, and specific requirements set out in various <i>technical circulars</i>
Level 3	from the <i>requirements of public and private sector clients</i> made up from their main contractors and suppliers
Level 4	from the <i>requirements of main contractors</i> made up from their sub-contractors, sub-sub-contractors and suppliers

Level 1 (CIRC and PCICB directives) in particular is seen as the over-riding catalyst and framework for environmental improvement throughout the construction industry, being manifested at least in public projects through *Level 2* (Technical Circulars).

ENVIRONMENTAL DRIVERS FROM THE CIRC AND PCICB

The CIRC report *Construct for Excellence* (January 2001) set out 109 recommendations recognised by industry as the authoritative roadmap towards a modern, safe, innovative, efficient and client-oriented construction industry. Seventeen of these specifically addressed

the environment. Progress on these environmentally-related recommendations, as reported by the PCICB¹, is having and will have further impacts on construction enterprises working on public sector projects. These recommendations are observed to have direct impacts on main contractors and they may also indirectly affect sub-contractors through the supply chain. CIRC recommendations outcomes to date include:

- **for public works projects:** introduction of a *marking scheme to assess contractor environmental performance*; new *procedures for regulatory actions* against contractors with environmental convictions; Environment, Transport and Works Bureau (ETWB) Technical Circulars on *site tidiness / cleanliness* and measures for *pay-for-waste-management* (target setting, monitoring, control, on-site sorting); and contract requirements for *dedicated personnel* for waste management.
- **for public housing projects:** requirements for contractors to submit an Environmental Management Plan (EMP) for demolition, piling, building and civil works; requirements to employ dedicated personnel for their EMPs; introduction of an integrated pay for environment, safety and hygiene scheme; and inclusion of contractor environmental performance in the Hong Kong Housing Authority *Contractors Premier League*.

In addition, public works and housing project specifications have been revised to facilitate use of recycled materials as hardcore in foundations, sub-base in road pavement and concrete in technically less demanding works (ETWB has identified some 100 projects).

Whilst these requirements so far affect mainly public sector projects, it is widely anticipated that they will in time begin to feature in private sector projects (examples are already evident, described further below), and will eventually filter down to SME sub-contractors and sub-sub-contractors. Although there is no recommendation to mandate ISO14001 in the construction sector, the CIRC report (para 8.50) encourages its voluntary adoption, with mandatory certification “*preferably considered at a later stage when the construction industry has acquired more expertise in tackling the environmental challenge*”.

ENVIRONMENTAL LEGISLATION AND REGULATIONS

The key supply chain pressure facing all construction related companies is compliance with legislative and regulatory requirements. Construction companies in particular have financial reasons for avoiding environmental convictions since these are considered when tendering for government contracts. Environmental legislation in Hong Kong consists of:

- *environmental ordinances and regulations* – the *Air Pollution Control Ordinance* (APCO), *Ozone Layer Protection Ordinance* (OLPO), *Noise Control Ordinance* (NCO), *Water Pollution Control Ordinance* (WPCO), *Waste Disposal Ordinance* (WDO), *Environmental Impact Assessment Ordinance* (EIAO); and
- *environmentally-related ordinances and regulations* – the *Factories and Industrial Undertakings Ordinance*, *Occupational Safety and Health Ordinance*, *Dangerous Goods Ordinance*, *Antiquities and Monuments Ordinance*, *Public Health and Municipal Services Ordinance*, and others.

New legislation and amendments are regularly introduced. On 2nd July 2004, the Legislative Council passed a Bill to implement a construction waste disposal charging scheme that will provide further supply chain pressure for environmental protection.

¹ PCICB Paper No 114 *Progress Report on Implementation of Recommendations of the Construction Industry Review Committee* (July 2004)

In addition to statutory requirements, construction companies also face various *Codes of Practice, Technical Memoranda, Guidance Notes, Practice Notes for Professional Persons, Practice Notes for Authorized Persons and Registered Structural Engineers* and *Technical Circulars* that address environmental matters related to construction sites.

Clearly for any company to be assured of compliance with relevant legislation and codes, a systematic process is required to identify, understand and keep up to date with the many requirements in place. This is a fundamental element and benefit of the ISO14001 EMS.

GOVERNMENT TECHNICAL CIRCULARS

ETWB *Technical Circulars* (TCs) are the key means of implementing policies and procedures relating to construction sites. Some 46 current TCs (issued from 1988 to date) include explicit requirements for environmental protection. New TCs since 2002, in addition to specifying the management of environmental impacts (e.g. ecological protection, waste minimisation, etc), are increasingly exerting a strong influence on the behaviour of contractors in several areas, particularly by:

- including environmental criteria in the *Management of Sub-contractors by Contractors* (TC 47/2002);
- evaluating environmental performance in the *Contractors' Performance Index System* (TC 24/2002);
- integrating environmental factors within *Tender Evaluation* for Works Contracts (TC 08/2004); and
- introducing *management systems and staged payments* for waste management (TCs 14/2003 and 15/2003).

TC 14/2003 (*Role of Departmental Safety and Environmental Advisor on HSE Protection on Construction Sites*) gives an insight into future developments, stating in *Section 1* that:

*“The objective to revise and extend the duties of Departmental Safety Advisor is to enhance the communication and management on environmental performance of contractors on construction sites so that the established framework for the **safety management system and the Pay for Safety Scheme can be extended for applying to environmental protection.**”*

Such requirements, although non-statutory, create strong drivers to the second and third tier players of the supply chain to move towards improved environmental management.

CLIENT REQUIREMENTS – PUBLIC WORKS AND RELATED DEPARTMENTS

Environmental supply chain requirements of public works and related departments include:

- adoption of environmental management practices on site to minimize adverse impacts caused by the construction activities, including trip ticket systems, waste management plans, pay for site cleanliness, environmental monitoring and independent environmental checking;
- encouragement in contract documents and specifications to use less environmentally damaging building materials and construction technologies new to Hong Kong such as prefabrication, left-in formworks and slip form construction;
- requirements for satisfactory contractor environmental performance in terms of compliance and mitigation of noise, water, air and waste problems both in the past (for tender evaluation) and during current projects.

Contracts for public buildings also increasingly include requirements for environmental assessments using the *Hong Kong Building Environmental Assessment Method* (HK-BEAM)². Only the EPD at present requires the implementation of an ISO14001 EMS for the design, build and operation of waste management facilities since 2000 (environmental monitoring is also specified, with a portion of the contract sum allotted for compliance with environmental requirements).

CLIENT REQUIREMENTS – PRIVATE DEVELOPERS AND UTILITY COMPANIES

Environmental requirements of private developers and utility companies include:

- environmental requirements in tender specifications, in most cases focusing on compliance with regulatory requirements;
- design and construction guidelines requiring or encouraging best environmental practices such as the use of more environmentally-friendly materials and the recycling of reusable waste materials; and
- more stringent requirements, such as the adoption of an *Environmental Management Plan* and *Environmental Monitoring and Auditing* are also required for projects designated under the *Environmental Impact Assessment Ordinance*.

More recently, requirements for *Waste Management Plans*, *Environmental Management Plans*, and employment of an independent environmental checker have been introduced in isolated and individual private sector projects. Private developers have also been keen to explore construction technologies new to Hong Kong such as prefabrication, left-in formworks and slip form construction. A large number of private developers also require their construction projects to be assessed against and certified under HK-BEAM.

CLIENT REQUIREMENTS – MAIN CONTRACTORS

Many of Hong Kong's leading main contractors have already obtained certification to ISO14001, and more continue to do so. Unlike other industries in which global partners and customers have demanded ISO14001 certification, its adoption in the construction industry has arisen on a purely voluntary basis.

Under a typical mode of operation in construction sector: Client/Designer – Main Contractors – Main contractors – Sub-contractors (service providers/materials suppliers), the main contractors play an important role in communicating the environmental requirements from the clients to their sub-contractors. Main contractors generally issue environmental guidelines to their sub-contractors that specify compliance with statutory and client requirements. Most main contractors appear to take full control of the construction project and site operation, with sub-contractors found to play minor roles in environmental protection (such as participation in training and education programmes), as they may simply supply labour and equipment to the main contractors without direct involvement in environmental management in construction projects.

As such the environmental requirements of clients are to a large degree absorbed by the main contractors and seldom reach the second or third tier players of the supply chain. Little significant or direct pressure appears to be directed to sub-contractors or sub-sub contractors other than requirements arising from the main contractors' adoption of an EMS, whether or not this is certified to ISO14001. However there is a strong desire from main contractors for sub-

² HK-BEAM has to date been adopted by 95 major developments, approximately 30% of which have been commissioned by public sector clients.

contractors to improve their environmental performance and ensure the necessary standards on site.

SOURCES OF ENVIRONMENTAL SUPPORT

The environmental supply chain requirements of local client organisations can be broadly categorised into five main areas:

SCP 1	Compliance with statutory environmental obligations (including the <i>Air Pollution, Water Pollution, Waste Disposal, Noise Control</i> ordinances, etc)
SCP 2	Implementation of <i>waste and environmental management plans</i> (WMP and EMP respectively) and/or an ISO14001 certified EMS
SCP 3	Implementation of <i>best practices for design and construction</i> stipulated in tender specifications and supplementary guidelines and handbooks, etc
SCP 4	<i>Environmental Monitoring and Auditing</i> , environmental checkers, performance tracking of site practices, suppliers and sub-contractors
SCP 5	Use of innovative techniques and technologies in design and construction such as life-cycle assessment and HK-BEAM performance benchmarking

Nineteen professional and academic institutions in Hong Kong have been identified that can offer expert advice and technical assistance, tailored to the specific needs of individual construction SMEs, on local environmental requirements, ISO14001 EMS, and pollution control measures:

Government related organisations	<ul style="list-style-type: none"> • Construction Industry Training Authority • Construction Industry Waste Reduction Task Force • Environmental Protection Department • Environment, Transport & Works Bureau • Hong Kong Productivity Council • Provisional Construction Industry Co-ordination Board • Trade & Industry Department (Support & Consultation Centre for SMEs)
Non-government / trade associations	<ul style="list-style-type: none"> • Business Environment Council • Chartered Institute of Water & Environmental Management (HK Branch) • Civic Exchange • Construction Industry Institute, Hong Kong • Hong Kong Construction Association • Hong Kong Institution of Engineers • Hong Kong Institute of Environmental Impact Assessment
Academic Institutions	<ul style="list-style-type: none"> • Chinese University of Hong Kong (Department of Architecture) • City University of Hong Kong (Professional Services Limited) • Hong Kong Polytechnic University, Department of Civil & Structural Engineering, Department of Building Services Engineering, Department of Land Surveying and Geo-Informatics, and Department of Building and Real Estate • Hong Kong University of Science & Technology, Department of Chemical Engineering, and Department of Civil Engineering • University of Hong Kong, Department of Architecture, Department of Mechanical Engineering and Department of Real Estate and Construction

The services offered by these organisations are highly diversified, depending upon their nature, mandate and scale, and include for example the provision of general information, ISO14001 mentorship, tailor-made training, best environmental practice guides, and pollution control technologies.

In addition, over 80 local consultancies provide construction related services in areas including environmental auditing, pollution control, impact assessments, analytical and laboratory services, training and strategy, and ISO14001 EMS development.