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Marketing Strategies for Development of Steel Construction in Hong Kong

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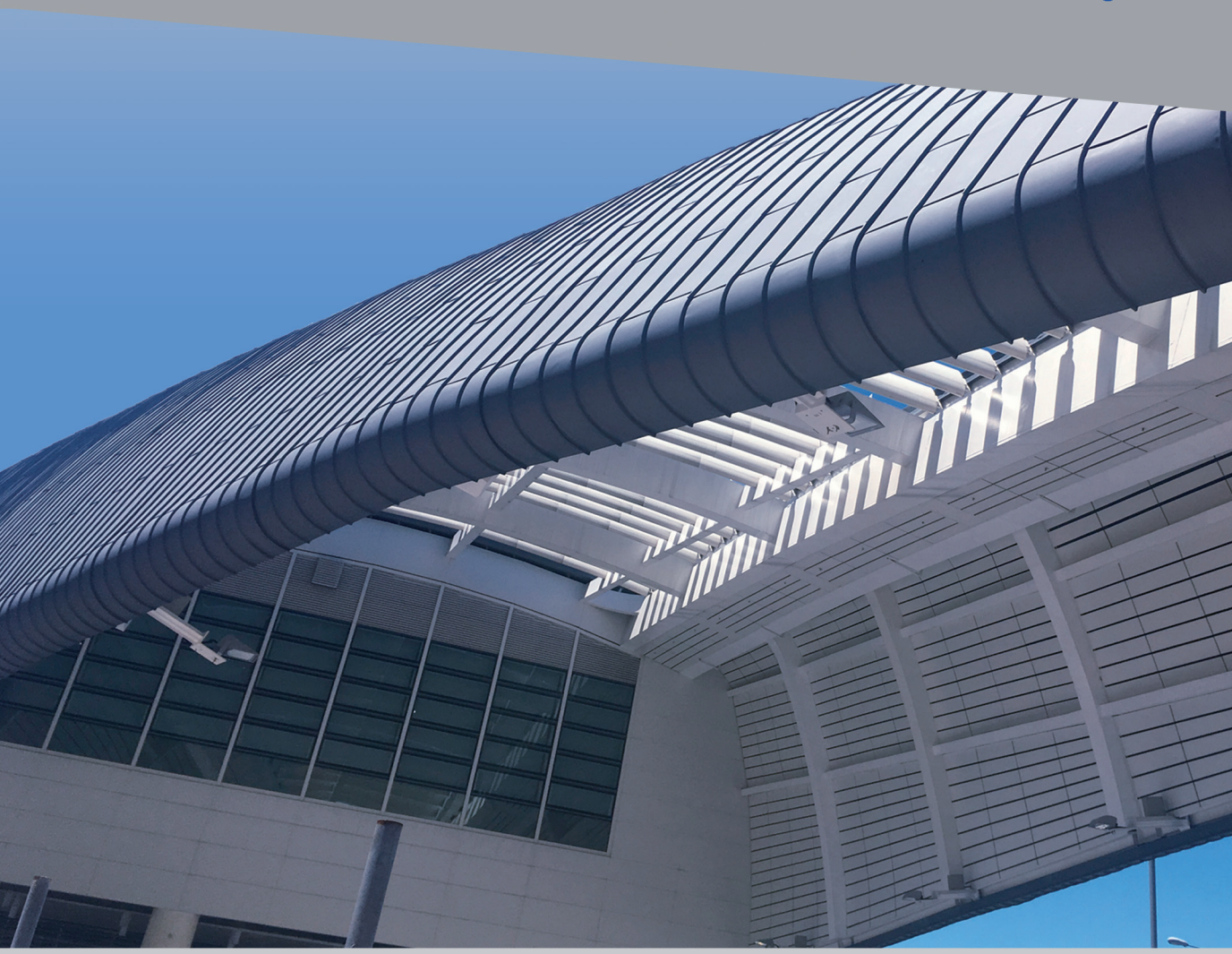

Greater Bay Area Modern Construction Technology

Hong Kong Experience on Steel Construction

Marketing Strategies for Development of Steel Construction in Hong Kong

Executive Summary

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1. Background

Steel, as a structural material, has been used in construction for more than two centuries. In many parts of the world steel structures have considerable merits over reinforced concrete structures in terms of constructability, sustainability, precision and elegance. However, steel construction is less preferred than reinforced concrete construction in Hong Kong. Over many years, the construction industry has evolved a preference for reinforced concrete structures due to their proven efficiency and competitiveness. As a result, construction practitioners are much more familiar, in general, with reinforced concrete construction than steel construction.

Owing to abundant supply of steel materials and structural steelwork in China in recent years, steel construction is often considered a practical and feasible alternative to reinforced concrete construction in Hong Kong. This study is conducted to examine successful projects of steel construction and solicit views and consensus of various stakeholders, in order to formulate marketing strategies to promote steel construction in Hong Kong.

2. Objectives and Methodology

During this study, the development of the steel construction sector in Hong Kong over the last three years was reviewed. This aimed to provide a strategic analysis of the current market situation and the potential for future applications of steel construction in Hong Kong.

2.1 Objectives

The primary objectives of the study were to:

a) review the steel construction sector in Hong Kong;
b) compare the costs of traditional reinforced concrete structures with steel structures;
c) identify the driving factors and barriers affecting the use of steel structures; and
d) formulate marketing strategies aimed at fostering active development of a steel construction industry in Hong Kong.

2.2 Methodology

To achieve these objectives, a number of research methods were used, including semi-structured interviews, case studies and questionnaire surveys supported by an extensive literature review and desktop searches.

Interviews were conducted with industry practitioners; specifically 4 developers, 2 structural engineering consultants, 5 main contractors, 4 steel specialist contractors, and 4 steel stockists (**Appendix A**). The interview questions mainly focused on:

a) steel supply chains and steel materials;
b) major differences between Hong Kong and overseas steel construction markets;
c) construction costs of structural steelwork in Hong Kong.

Case studies are presented, identifying the benefits of steel-framed structures over reinforced concrete structures. It should be noted that analyses on case studies help understand various economic, industrial, and technical considerations that specifically influence the development of the steel construction sector.

The purpose of the questionnaire survey was to determine the predominant driving factors and barriers that affect the use of steel structures in Hong Kong. Construction companies, developers and consultants directly involved in steel construction projects in Hong Kong in the past three years, were approached to solicit their views. The mean score ranking technique was used to prioritise the individual driving factors and barriers.

3. Overview of the Market

The demand for structural steelwork was not strong in Hong Kong during the three-year period of study. Structural steelwork occupied only 1% to 2% of the construction market share. About 0.2 million to 0.3 million tons of steel structures were erected in each year.

42 suppliers of materials and specialist contractors in the category "Structural Steelwork" were approved for public works by the Development Bureau in 2016. 439 registered subcontractors were placed within its "Structural Steelwork" category by the Construction Industry Council. However, approximately only 10 contracting companies were capable of carrying out large-scale structural steelwork (i.e. thousands of tons) in the public sector. Classified by principal trades, the numbers of skilled structural steel erectors and structural steel welders in 2016 were about 60 and 460, respectively. These small numbers reflect a low level of demand on skilled labour for structural steelwork.

3.1 Steel supply chains

Figure 1 illustrates two different steel supply chains relating to steelwork construction in Hong Kong. It should be noted that:

- Route (A) is the common steel supply chain in Hong Kong. Firstly, steel materials from different parts of the world are transported to Hong Kong. Local steel stockists usually conduct visual and dimensional checks to ensure that no bend, dent or corrosion has occurred in transit. The steel stockists also possess ISO 9001 certificates which certify their management systems for stockholding, simple fabrication and sales of steel materials and accessories. Secondly, the stockists, as mid-way storage, are experts at sourcing steel materials from overseas markets. Thirdly, it is practical for small transactions when the quantity required by a project fails to meet the minimum order quantity policy of steel mills (MOQ is normally of 200 metric tons).

- Route (B) is applicable to large transactions that satisfy MOQ policies. Due to the recent cancellation of bonded policy on the import of 78 types of steel products, tariffs and import-related taxes are imposed upon them. For this reason, local construction companies may tend to use more Chinese steel products to keep costs down, as stated by a steel specialist contractor. Compared with Route (A), Route (B) can also reduce double-handling problems.

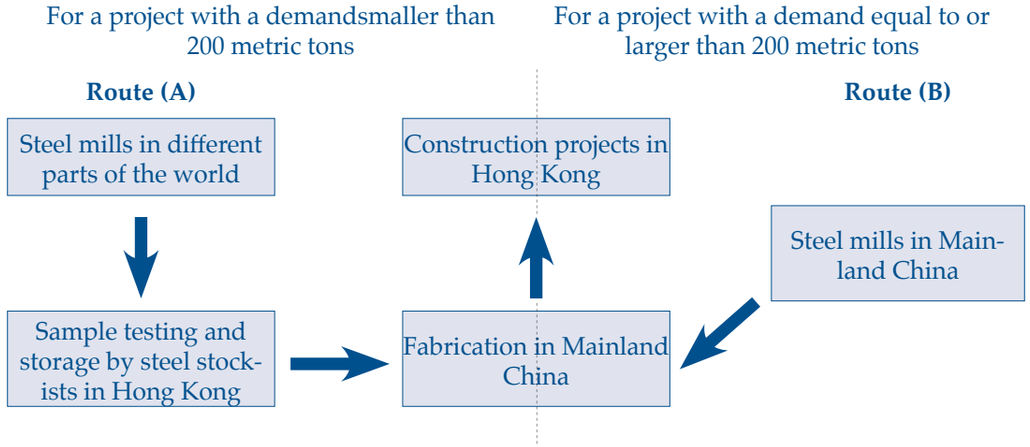


Figure 1 Typical steel supply chain
Source: Steel stockists, Steel specialist contractors, Main contractors

3.2 Steel materials to British materials specifications

Typically, H- and I- sections are imported mainly from South Korea, Thailand, Taiwan, and Europe, whereas hollow sections and plates predominantly come from Mainland China (**Figure 2**). The steel mills in Mainland China are able to produce hollow sections and plates according to British Standards (BS) but not H- and I- sections. It is not easy to upgrade rolling machines in many Chinese steel mills so as to produce a wide range of section sizes. Although, as stated, some large-scale steel mills in Mainland China are capable of producing H- and I- sections according to BS, the demand in Hong Kong is often too small to meet the MOQ. These mills are not eager to win the small Hong Kong orders. Other competitors, such as those steel mills in Taiwan, a steel stockist said, are willing to offer small quantities to the Hong Kong market.

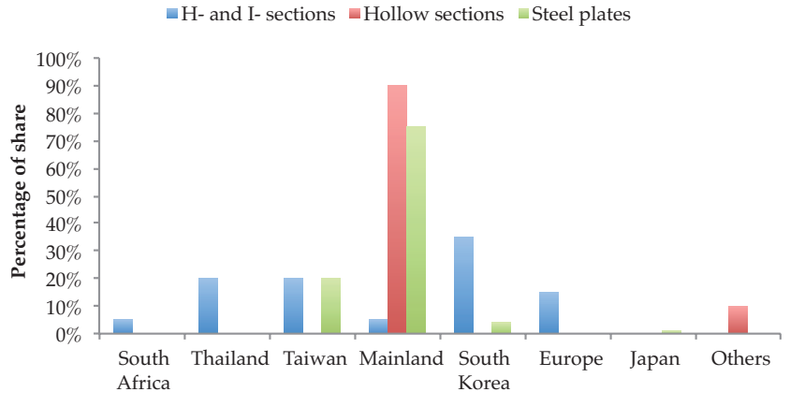


Figure 2 Relative supplies of steel materials by countries/regions
Source: A steel stockist.

3.3 Equivalent steel materials specifications

Published by the Hong Kong Constructional Metal Structures Association, the Macau Society of Metal Structures, and the Chinese National Engineering Research Centre for Steel Construction, the "Professional Guide on Selection of Equivalent Steel Materials to European Steel Materials Specifications" (2015) presents design methodologies to enable selection of steel materials, e.g. Chinese steel materials, to be equivalent to European steel materials. This design guide offers application rules that widen the available sources of steel materials, enabling designers to flexibly use a wide range of steel materials and to potentially expand the market. Acceptable steel material specifications to Chinese, Japanese, Australian, American and European standards are also listed in the "Code of Practice for the Structural Use of Steel" (2011) published by the Buildings Department.

In Singapore, the Building and Construction Authority published the "Design Guide on Use of Alternative Structural Steel to BS 5950 and Eurocode 3" (2012), which provides a list of certified steel materials manufactured according to steel materials specifications adopted in Europe, America, China, Japan, and Australia/New Zealand. This design guide serves as a definitive reference on efficient use of alternative steel materials in Singapore.

Although the Buildings Department accepts steel materials manufactured according to non-British standards such as Chinese National Standards (GB) and Japanese Industrial Standards (JIS), the use of steel materials specifications other than BS is still limited because "the approval procedure is very complicated", as a steel specialist contractor said.

3.4 Major differences with overseas markets

Some interviewees have been engaged in steel construction projects in overseas, such as Macau, Singapore, Mainland China, the U.K., the U.S.A., and Japan. Some of observed differences between Hong Kong and overseas steel construction markets are summerised as follows.

Industry practice

- Overseas markets are willing to accept innovative construction.
- For overseas projects, the demand for steel materials is often great due to large-scale projects, sufficient construction time, e.g. super high-rise buildings in Mainland China, casinos in Macau, and retail buildings in Singapore.

Industry capacity and support

- Many skilled workers and experienced structural steel engineers are readily available to provide technical support in overseas markets.
- There is also good government support to steel construction in overseas markets. For instance, the Building and Construction Authority in Singapore publishes the definitive reference entitled "Design Guide on Use of Alternative Structural Steel to BS 5950 and Eurocode 3" (2012), which facilitates the use of a wide range of steel materials.

Logistics arrangement

- There are few site constraints affecting delivery, storage, and erection in overseas projects.

Regulation and statutory requirements

- There is a major difference in regulation and statutory requirements. In Hong Kong, approvals, consents and quality control requirements are required to be thoroughly documented and controlled by regulatory authorities. Engineers in overseas projects tend to have more autonomy over design, construction and quality control of structural steelwork.

- There is a shortage of skilled workers in Hong Kong as imported workers are restricted. However, fewer constraints are found in Macau and Singapore.

Modular construction

- Steel-framed modular construction is highly viable for cellular type buildings with multiple repetitive units, such as student hostels, worker accommodation, and temporary housing. Modular construction is emerging as an economic and sustainable construction in the U.S.A., Europe, Singapore and many other developed economies, but not yet in Hong Kong.

3.5 Data on construction costs of structural steelwork

Structural steel materials have been expensive for many years, but there is now a decreasing trend in the unit prices of steel materials (**Figure 3**).

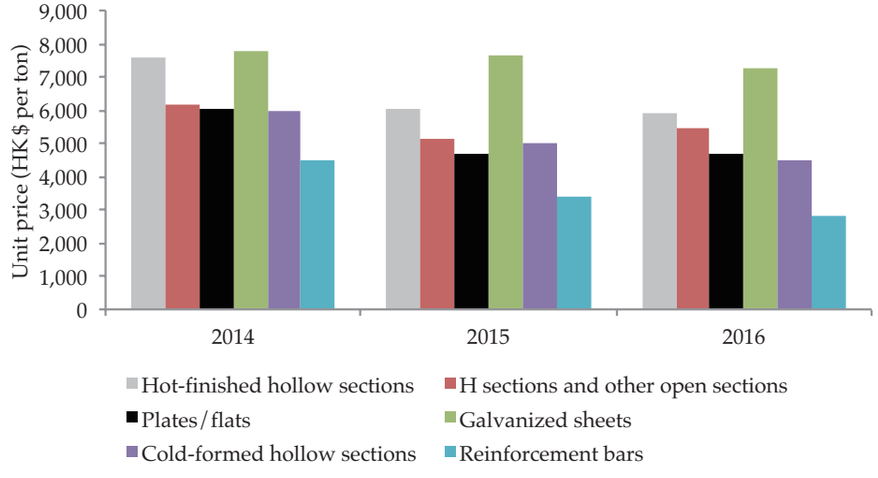
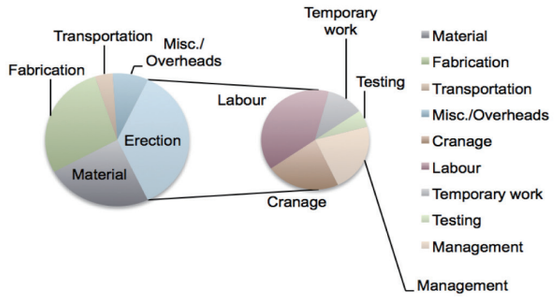


Figure 3 Unit prices of steel materials

Source: Steel stockists. Approximate data was offered for commercial considerations.

Figure 4 shows the cost breakdown for various steel materials. The construction rate in 2015/16 for structural steelwork in Hong Kong ranges from HK$ 25,000 per ton to HK$ 30,000 per ton, which can escalate to HK$ 50,000 per ton for some project-specific features depending on shapes and sizes, and special design requirements (such as structural steelwork in a theme park).



Category	Components	Percent	Rate
Material	Material	16%-24%	4,000-6,000
Fabrication	Fabrication	18%-28%	4,500-7,000
Transportation	Transportation	1%-3%	500-900
Misc./ Overheads	Misc./ Overheads	8%	2000
Erection	Cranage	8%-16%	2,000-4,000
	Labor	14%	3,500-4,200
	Temporary work	4%	1,000-1,200
	Testing	2%	500-600
	Management	12%	3,000-3,600
TOTAL		**100%**	**25,000-30,000**

Figure 4 Cost breakdown for structural steelwork
Source: Main contractors and steel specialist contractors

4. Case Studies

Among various projects discussed during the interviews with practitioners, three recent structural steel projects were reported as follows.

In general, structural steelwork will be adopted if there are important technical requirements in a project, i.e. a "must-have" project such as a super high-rise building (e.g. International Commerce Centre), and a column-free structure (e.g. the Xiqu Centre and the Kennedy Town Swimming Pool Phase II, **Figure 5**). For these featured projects, structural steelwork can readily achieve high cost efficiency and good constructability.

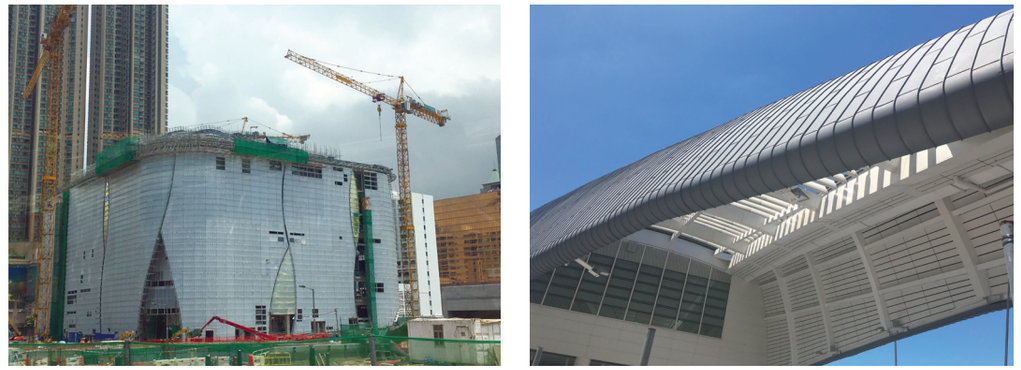


Figure 5 Xiqu Centre (left) and Kennedy Town Swimming Pool Phase II (right)

4.1 The Xiqu Centre

The Xiqu Centre is purpose-built to provide a column-free space with a long span structure. As it is close to an MTR station, the foundation of the building is weak. The only feasible solution is to adopt a structural steelwork superstructure with a small self-weight to achieve completion on time and within budgets.

4.2 Kennedy Town Swimming Pool Phase II

The Kennedy Town Swimming Pool Phase II is uniquely designed as a triangular space truss to provide a large column-free space. The swimming pool features a reinforced concrete base supporting an elegant curved steel roof. Moreover, the New Engineering and Construction Contract (NEC3) is adopted in this project to promote partnership and collaboration between client, project manager, architect, consultant, contractor, and government. The advantages of NEC3 are listed as follows:

a) communication is enhanced among project team members through frequent discussions of potential risks and disputes;

b) management and decision-making becomes efficient; and
c) completion of the project is advanced by 2 weeks.

4.3 A retail building recently built in Hong Kong Island

The construction costs of this Grade A retail building, with a gross floor area of 95,000 m^2, are compared in **Figure 6** for a reinforced concrete scheme and an alternative steel-framed scheme. The structural cost of the steel-framed scheme is 20% higher than that of the reinforced concrete scheme. On the other hand, the steel-framed scheme provides a 20% saving in the foundation costs and a 6% saving in preliminaries. Overall, the total construction cost of the steel-framed scheme is estimated to be HK$ 24.5 M higher than that of the reinforced concrete scheme.

However, the speed of construction of the steel-framed scheme can result in an earlier completion by 5 months, bringing in a significant sum of about HK$ 150 M as an extra rental income. As a result, the steel-framed scheme can generate a profit of HK$ 125.5 M.

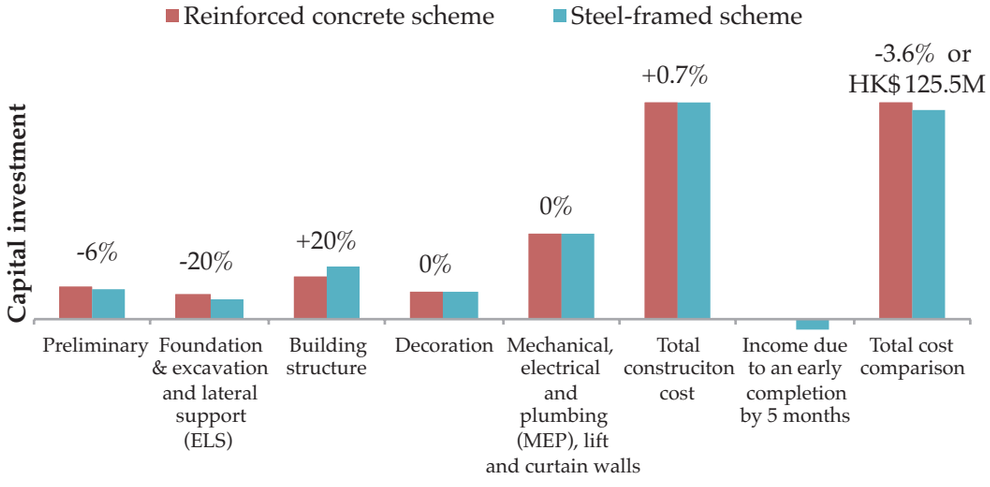


Figure 6 Cost comparison between a reinforced concrete scheme and a steel-framed scheme
Source: A steel specialist contractor

4.4 Benefits of steel-framed structures

Benefits of steel-framed structures are highlighted as follows.

- Reduced self-weight. Steel construction is often adopted where the foundation is weak and the superstructure of a building is heavy. The use of structural steel reduces the self-weight of the building. Foundation costs can then be reduced because of the lighter superstructure. Hence, steel-framed structures can be cost efficient for high-rise buildings and long spanning structures.

- Rental income arising from early completion. For commercial buildings, an increased speed of construction because of the use of structural steelwork can shorten construction time and reduce preliminaries. Although the construction costs of the steel-framed buildings are generally higher than those of reinforced concrete buildings, their early completion provides the client with rental income, which often outweighs the higher construction cost. This benefit is particularly relevant for commercial buildings with retail shops.

5. Questionnaire Survey

A questionnaire survey was administered among 129 experienced practitioners (**Figure 7**) to determine those driving factors and barriers predominantly affecting the use of structural steelwork in Hong Kong. The respondents were grouped by the following categories, i) developers (7.8%), ii) main contractors (28.7%), iii) steel specialist contractors and subcontractors (15.5%), iv) consultants (26.4%), v) government agencies (13.2%), and vi) others (e.g. suppliers) (8.5%).

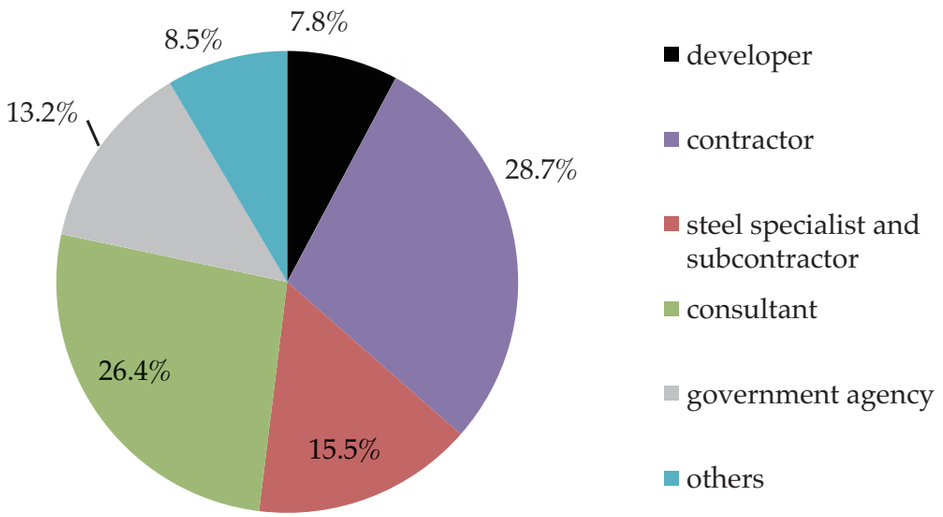


Figure 7 Distribution of respondents by stakeholder categories

5.1 Driving factors promoting the use of structural steelwork

A total of 12 driving factors are consolidated according to analyses on interviews and case studies as follows;

Design phase

1. "Must-have" requirements (e.g. super high-rise/long span structures, weak foundation)
2. Elegant simplicity and transparency of architectural appearance
3. Flexible layout with column-free spaces
4. Large usable areas with slim columns
5. Facilitating seismic resistant design and construction of buildings

Construction phase

1. Prefabrication work overlaps in time with construction of foundation and other building works
2. Increased speed of construction
3. Saving of materials, especially in foundation and building works
4. Minimal amounts of material wastage
5. Relieving labour shortage on site
6. Ease of installation, dismantlement, demolition and re-use of structural members
7. Easy structural extension, modification and addition.

The results of the questionnaire survey corroborated that "must-have" requirements and increased speed of construction are the two key driving factors most affecting the choice of a steel-framed building in Hong Kong (**Table 1**).

Table 1 Ranking of the driving factors

Ranking	Factor	Mean*	Standard deviation
1	"Must-have" requirements (e.g. super high-rise/long span structures, weak foundation)	4.13	0.88
2	Increased speed of construction	4.10	0.91
3	Ease of installation, dismantlement, demolition and re-use of structural members	3.83	0.95
4	Elegant simplicity and transparency of architectural appearance	3.75	0.87
5	Prefabrication work overlaps in time with construction of foundation and other building works	3.75	0.89
6	Flexible layout with column-free spaces	3.74	0.80
7	Saving of materials, especially in foundation and building works	3.69	1.02
8	Large usable areas with slim columns	3.68	0.83
9	Easy structural extension, modification and addition	3.59	0.89
10	Minimal amounts of material wastage	3.52	1.03
11	Relieving labour shortage on site	3.51	1.04
12	Facilitating seismic resistant design and construction of buildings	3.38	1.00

Note: *Based on a five-point Likert scale (1=not important, 2=slightly important, 3=moderately important, 4=important, and 5=very important).

5.2 Barriers inhibiting the use of structural steelwork

A total of 25 barriers are consolidated according to analyses on interviews and case studies as follows.

Design phase

1. Lack of relevant and compatible design codes, guidelines and tools
2. Inflexibility in relation to last-minute change
3. Late involvement of contractors in the design process
4. Shortage of experienced designers and draughtsmen
5. Complicated procedures for design approvals and consent
6. Prolonged time needed for various preparation processes involved in construction drawings, structural detailing, and welding and erection procedures

Material procurement

7. Limited choices of quality steel producers
8. Varied quality of steel fabricators
9. Concern about quality control of steel materials and fabrication
10. Logistic issues on transportation and storage
11. Prolonged delivery lead time for material procurement and fabrication

Construction phase

12. High construction costs
13. Shortage of skilled labour
14. Shortage of supervisors working directly under main contractors
15. Lack of experienced and skilled contractors for design and construction of temporary work
16. Limited space in construction sites
17. Special machinery requirements
18. Additional installation of protective coatings to structural steelwork
19. Incompatibility with E&M works
20. Extra costs of acoustic insulation
21. Long-term maintenance problems

Industry practice

22. Lack of education, training, and design experience on structural steelwork
23. Reluctance to use structural steelwork
24. Unfamiliarity with structural design codes and methods
25. Poor appreciation on advantages of effective design and construction of structural steelwork

The results of the questionnaire survey verified that the shortage of experienced engineers, supervisors, draughtsmen and skilled labour, high construction costs, and lack of education, training, and design experience on structural steelwork are the most critical barriers inhibiting the use of structural steelwork in Hong Kong (**Table 2**).

Table 2 Ranking of the top 10 barriers

Ranking	Factor	Mean*	Standard deviation
1	Shortage of skilled labour	3.80	0.99
2	Shortage of experienced supervisors working directly under main contractors	3.76	1.00
3	High construction costs	3.72	1.00
4	Shortage of experienced designers and draughtsmen	3.71	0.99
5	Lack of education, training, and design experience on structural steelwork	3.63	1.00
6	Reluctance to use structural steelwork	3.56	0.96
7	Poor appreciation on the advantages of effective design and construction of structural steelwork	3.52	0.96
8	Prolonged delivery lead time for material procurement and fabrication	3.52	0.97
9	Late involvement of contractors in the design process	3.52	1.00
10	Lack of experienced and skilled contractors for design and construction of temporary work	3.51	0.96

Note: *Based on a five-point Likert scale (1=not critical, 2=slightly critical, 3=moderately critical, 4=critical, and 5=very critical).

Given the lack of local steel producers and fabricators in Hong Kong, steel materials and structural steelwork need to be imported from different parts of the world. Fabrication plants and temporary storage yards are limited because of scarce land resources in Hong Kong. Because of these factors, structural steelwork is commonly considered expensive for many years. Another major hurdle is the shortage of skilled structural steelwork labour for steel construction. The fact of a limited availability of skilled steel erectors and welders may further escalate construction costs.

In addition to the above hurdles, extrinsic factors that push up construction costs cannot be ignored. Over provision (i.e. excessive steel materials provided in design and over-complex

connection details) has long been criticised as it always lead to high material and fabrication costs of structural steelwork and increased difficulties during erection. This problem will further result in increased resources in preparation of shop drawings, and even rework problems, which induces extra costs to contractors. Thus, contractors tend to allow a high contingency in bids to cover for uncertainties. All of these contribute to various extents to increased reluctance to adopt steel construction in Hong Kong.

6. Conclusions

6.1 An outlook into the near future

An outlook for steel construction in Hong Kong in the next five years gives a bright future:

1. some retail buildings in the Central and Sheung Wan;
2. purpose-built projects such as the new Airport Terminal in the Lantau Isalnd, the Cross Bay Link in and Tseung Kwan O, and various projects to be built in the Kai Tak District (e.g. Kai Tak Stadium Complex);
3. modular construction for student hostels, worker accommodation and transitional housing.

An increased speed of construction of structural steelwork contributes to reduced construction time and thus, early completion. This generates rental income, and an early payback to client. This financial incentive often favours a selection of steel-framed structures.

Reduced self-weight of building structures is always a major benefit, which also reduces foundation costs. Long spanning steel roofs provide large column-free spaces in the new Airport terminals. The steel arch supports the 200 m long main span of the Cross Bay Link Bridge.

The potential for steel-framed modules is tremendous in Hong Kong. Modular construction is suitable for projects on which site constraints demand more off-site prefabrication. It is also appropriate when there is an overriding requirement for a short construction period and early occupancy of the buildings, e.g. public housing, to alleviate social problems in Hong Kong.

6.2 Marketing strategies

As a wide variety of structural steelwork will be adopted in Hong Kong, a set of marketing strategies are proposed to tackle the barriers above so that the potential for steel construction in Hong Kong can be fully exploited.

Given the diversity of stakeholders and the complexity of the market, it is deemed essential, at a strategic level, (1) to establish a **Standing Committee on Structural Steel Technology** to promote wide and efficient use of structural steelwork. The mission and the key tasks for the Committee are listed in **Appendix B**.

Facilitating technical know-how to avoid over design is of pressing importance. In this regard, (2) **Education and Continuing Professional Development** on effective design and construction, codified methods and design software, and (3) **Research and Development** on effective use of structural steelwork addressing technical and cost issues are fundamental to the marketing strategy.

The shortage of skilled labour and experienced contractors is also a major hurdle prohibiting the development of steel construction in Hong Kong. In this regard, (4) **Specialist Training Courses and Qualification Schemes** should be formulated to ensure an adequate supply of skilled labour and to improve technical competence of contractors.

The use of structural steelwork fabricated in Mainland China will be advantageous for Hong Kong because they are supplied with acceptable quality and relatively low cost. Moreover, there is a reliable supply, and transportation costs are acceptable. To ensure the quality of Chinese steel materials and structural steelwork, it is necessary (5) to launch a **Steel Fabricators Accreditation Scheme** through independent certification bodies to specific standards applicable to all parties engaged in steel production, fabrication, design, delivery, and erection of structural steelwork. Similar schemes have been established in many other countries. These schemes not only upgrade technical capabilities of steel fabricators but also enable clients, consultants and contractors to select reliable downstream facilities. In addition, (6) practitioners should be able to **adopt efficient use of equivalent steel materials** in construction projects.

To facilitate early completion of steel projects, (7) **a collaborative contractual relationship** among clients, project managers, contractors, architects, consultants, fabricators and suppliers should be developed. For instance, the use of NEC3 can develop partnerships and improve project performance. The early completion of the Kennedy Town Swimming Pool Phase II may be the result of such a collaborative contractual relationship. Last but not the least, the prolonged times taken to obtain design approvals for structural steelwork may be due to the lack of structural steel expertise in the regulatory agents in Hong Kong. In view of this, (8) **steel construction experts should be commissioned by regulatory agents** to advise on technical issues on design and construction of structural steelwork.

Appendix A: List of the interviewees

Table Positions of interviewees and the interview approaches used

Stakeholders	Interviewee	Job position	Interview approach
Steel stockist A1	(1) (2)	Director Deputy General Manager	Face to face
Steel stockist A2	(3)	Technical Manager	Telephone
Steel stockist A3	(4)	Managing Director	Face to face
Steel stockist A4	(5) (6)	Sales & Marketing Manager General Manager - Production	Face to face
Structural engineering consultant B1	(7)	Director	Written script
Structural engineering consultant B2	(8)	Director	Written script
Steel specialist contractor C1	(9)	Assistant General Manager	Written script & telephone
Steel specialist contractor C2	(10)	Director	Face to face
Steel specialist contractor C3	(11)	Managing Director	Face to face
Steel specialist contractor C4	(12)	Director	Face to face
Main contractor D1	(13)	Technical Manager	Written script & face to face
Main contractor D2	(14) (15)	Executive Director & Chief Engineer Senior Contracts Manager	Face to face
Main contractor D3	(16)	General Manager (Technical)	Written script
Main contractor D4	(17) (18) (19)	Executive Director Deputy Project Manager Assistant Project Manager	Face to face
Main contractor D5	(20)	Senior Project Manager	Face to face

Stakeholders	Interviewee	Job position	Interview approach
Client E1	(21) (22)	Senior Project Manager Project Manager	Face to face
Client E2	(23)	Project Manager	Face to face
Client E3	(24) (25) (26) (27)	General Manager (Engineering) Senior Deputy General Manager Senior Engineer Engineer	Face to face & written script
Client E4	(28)	Assistant Director	Written script

Appendix B: Key tasks of the Standing Committee on Structural Steel Technology

Mission

- To assure quality standards of structural steel manufactured in overseas and Mainland China which are imported to Hong Kong for construction of infrastructure and building structures.
- To provide updated design information and data for design of structural steel in Hong Kong.
- To promote and enhance specifications and construction technologies of structural steel in Hong Kong for improved quality and efficiency.
- To promote training of structural engineers, technicians and supervising personnel on effective design and construction of steel structures in Hong Kong.

Tasks

- To oversee construction standards, specifications, handbooks and technical documents related to all aspects of structural steel, including material testing, quality control, structural design, fabrication, erection, and maintenance.
- To compile construction cost indices for steel construction.
- To provide data and information relating to modern technology of steel construction practiced in Hong Kong and overseas.
- To encourage education and continuing education on structural steel design in universities and engineering institutes, and to promote structural steel training programs.
- To facilitate research and development on application of structural steel.
- To support and encourage use of structural steel certification schemes for fabricators in and outside Hong Kong supplying to government and prominent private developers' projects.
- To encourage extensive use of China steel materials for cost effectiveness and for improved quality assurance.

Marketing Strategies for Development of Steel Construction in Hong Kong

Exectuive Summary

Steel, as a structural material, has been used in construction for more than two centuries. In many parts of the world steel structures have considerable merits over reinforced concrete structures in terms of constructability, sustainability and precision elegance. However, steel construction is less preferred than reinforced concrete construction in Hong Kong. Over many years, the construction industry has evolved a preference for reinforced concrete structures due to their proven efficiency and competitiveness. As a result, construction practitioners are much more familiar, in general, with reinforced concrete construction than steel construction.

Owing to abundant supply of steel materials and structural steelwork in China in recent years, steel construction is often considered a practical and feasible alternative to reinforced concrete construction in Hong Kong. This study is conducted to examine successful projects of steel construction and solicit views and consensus of various stakeholders, in order to formulate marketing strategies to promote steel construction in Hong Kong. The primary objectives of the study are to: a) review the steel construction sector in Hong Kong; b) compare the costs of traditional reinforced concrete structures with steel structures; c) identify the driving factors and barriers affecting the use of steel structures; and d) formulate marketing strategies aimed at fostering active development of a steel construction industry in Hong Kong.

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