SPON'S

ASIA PACIFIC

CONSTRUCTION COSTS HANDBOOK

Fifth Edition

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CONSTRUCTION COSTS HANDBOOK

Fifth Edition

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Preface

This book is designed to be a convenient reference. Its purpose is to present coherent snapshots of the economies and construction industries of the Asia Pacific region. It is not a substitute for local knowledge and professional advice. It will, however, be extremely useful as an introduction to a country and its construction industry for clients, consultants, contractors, manufacturers of construction materials and equipment and others concerned with development, property and construction in the region.

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2015

Acknowledgements

The contents of this book have been gathered together from a variety of sources – individuals, organisations and publications. Construction cost data and general background information on local construction industries are based on contributions from a network of professional colleagues and associates worldwide. These include:

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Much of the statistical data is from World Bank Development Reports, the *Economist World in Figures* and official published statistics. The background on individual countries has come from local sources, national yearbooks, annual reports and *Economist Intelligence Unit Reports*.

Important sources of general and construction industry data have been from various embassies, high commissions, trade missions, statistical offices and government departments. Information on international contracting is

largely based on surveys undertaken by *Engineering News Record* magazine. Data on exchange rates and consumer price indices come mainly from the *Financial Times* or International Monetary Fund publications.

Specific acknowledgements and sources are given where appropriate in each country. The research and compilation of this book were undertaken by Langdon & Seah.

How to use this book

This book is in three parts – *Part I: Regional Overview*; *Part II: Individual Countries*; and *Part III: Comparative Data*. The 16 countries covered in the book are listed in the Contents.

Part I: Regional Overview
Part I comprises an essay – *The construction industry in the Asia Pacific region* – which describes the current situation and main trends in the construction industries covered in this publication.

Part II: Individual Countries
In Part II the 16 countries are arranged in alphabetical order, and each is presented in a similar format under the following main headings:

- *Key data* provides main national, economic and construction indicators.
- *The construction industry* outlines the structure of the industry, tendering and contract procedures plus the regulations and standards.
- *Construction cost data* includes data on labour and material costs, measured rates for items of construction work and approximate estimating costs per square metre for different building types.
- *Exchange rates and inflation* present data on exchange rates with the pound sterling, US$, euro and Japanese yen, and include data on the main indices of price movements for retail prices and construction.
- *Useful addresses* give the names and addresses of public and private organisations associated with the construction industry.

Part III: Comparative Data
To allow comparison between countries covered in the book, Part III brings together data from Part II and presents them under three main headings:

- *Key national indicators* including financial and demographic data.
- *Construction output indicators* including output per capita.
- *Construction cost data* including labour and material costs and costs per square metre.

Abbreviations

Length

kilometre	km
metre	m
decimetre	dm
millimetre	mm
yard	yd
foot	ft
inch	in

Area

hectare	ha

Volume

kilolitre	kl
hectolitre	hl
litre	l
millilitre	ml

Weight (Mass)

tonne	t
kilogram	kg
gram	g
hundredweight	cwt
pound	lb
ounce	oz

Force

kilonewton	kN
newton	N
not available	N/A

Conversion factors

Length

Metric		**Imperial equivalent**
1 kilometre	1000 metres	0.6214 miles
		1093.6 yards
1 metre	100 centimetres	1.0936 yards
	1000 millimetres	3.2808 feet
		39.370 inches
1 centimetre	10 millimetres	0.3937 inches
1 millimetre		0.0394 inches
Imperial		**Metric equivalent**
1 mile	1760 yards	1.6093 kilometres
	5280 feet	1609.3 metres
1 yard	3 feet	0.9144 metres
	36 inches	914.40 millimetres
1 foot	12 inches	0.3048 metres
		304.80 millimetres
1 inch		25.400 millimetres

Area

Metric		**Imperial equivalent**
1 square kilometre	100 hectares	0.3861 square miles
	10^6 square metres	247.11 acres
1 hectare	10,000 square metres	2.4711 acres
		11,960 square yards
1 square metre	10,000 square centimetres	1.1960 square yards
		10.764 square feet
1 square centimetre	100 square millimetres	0.1550 square inches
1 square millimetre		0.0016 square inches

(*Continued*)

Imperial		Metric equivalent
1 square mile	640 acres	2.5900 square kilometres
		259.00 hectares
1 acre	4840 square yards	0.4047 hectares
		4046.9 square metres
1 square yard	9 square feet	0.8361 square metres
1 square inch		6.4516 square centimetres
		645.16 square millimetres

Volume

Metric		Imperial equivalent
1 cubic metre or 1 kilolitre	10 hectolitres	1.3080 cubic yards
	1000 cubic decimetres	35.315 cubic feet
	1000 litres	
1 hectolitre	100 litres	3.5315 cubic feet
		21.997 gallons
1 cubic decimetre or 1 litre	1000 cubic centimetres	61.023 cubic inches
	1000 millilitres	0.2200 gallons
		1.7598 pints
		0.2642 US gallons
		2.1134 US pints
1 cubic centimetre or 1 millilitre	1000 cubic millimetres	0.0610 cubic inches

Imperial		Metric equivalent
1 cubic yard	9 cubic feet	0.7646 cubic metres
1 cubic foot	1728 cubic inches	28.317 litres
	6.2288 gallons	
	7.4805 US gallons	
1 cubic inch		16.387 cubic centimetres
1 gallon	8 pints	4.5461 litres
1 pint		0.5683 litres
US		
1 barrel	42 gallons	158.99 litres
1 gallon	8 pints	3.7854 litres
1 pint		0.4732 litres

Weight (Mass)

Metric		Imperial equivalent
1 tonne	1000 kilograms	0.9842 tons
		1.1023 US tons
		2204.6 pounds
1 kilogram	1000 grams	2.2046 pounds

		35.274 ounces
1 gram		0.0353 ounces
Imperial		**Metric equivalent**
1 ton	20 hundredweights	1.0160 tonnes
	2240 pounds	1016.0 kilograms
1 hundredweight	112 pounds	50.802 kilograms
1 pound	16 ounces	0.4536 kilograms
		453.59 grams
1 ounce		28.350 grams
US		
1 ton	20 hundredweights	0.9072 tonnes
	2000 pounds	907.18 kilograms
1 hundredweight	100 pounds	45.359 kilograms

Force

Metric		**Imperial equivalent**
1 kilonewton	1000 newtons	0.1004 tons force
		0.1124 US tons force
1 newton		0.2248 pounds force
Imperial		**Metric equivalent**
1 ton force	2240 pounds force	9.9640 kilonewtons
1 pound force		4.4482 newtons
US		
1 ton force	2000 pounds force	8.8964 kilonewtons

Pressure

Metric	**Imperial equivalent**
1 newton per square millimetre	145.04 pounds force per square inch
1 kilonewton per square metre	20.885 pounds force per square foot
Imperial	**Metric equivalent**
1 pound force per square inch	6.8948 kilonewtons per square metre
	0.0069 newtons per square millimetre
1 ton force per square inch	107.25 kilonewtons per square metre
	0.1073 newtons per square millimetre
US	
1 ton force per square foot	95.761 kilonewtons per square metre
	0.9576 newtons per square millimetre

Langdon & Seah

Practice profile

As of April 2012, Langdon & Seah (L&S) merged with ARCADIS, which has an extensive international network and 22,000 employees worldwide.

ARCADIS also have within the group, EC Harris, a renowned and leading global Built Asset Consultancy.

Apart from our Singapore experience, L&S being an international group with wide geographical spread in the region and being part of ARCADIS group with an international network, we have the relevant experience and expertise to add value to the project with relevant cost models backed up with evidence-based design parameters, risk management, built asset considerations and various project experience. Knowledge transfer/sharing is seamless between offices.

In Asia, we have approximately 3400+ personnel working in 44 offices.

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In addition to the financial management of construction projects, L&S also undertakes varied construction industry research and consultancy assignments worldwide, ensuring a broadly based and truly international information service to their clients.

The value of the organisation's international experience, research and information is distilled into the strategic advice and services offered to L&S' individual clients and also provides data for publications, such as this current *Spon's Asia Pacific Construction Costs Handbook*.

Professional services

L&S specialises in the financial management of construction projects, from inception to completion. Their range of services include

- Investment Appraisals
- Brief Development
- Construction Cost Management
- Cost and Time Planning
- Strategic Procurement Advice and Management
- Tender and Contract Documentation
- Project Management
- Dispute Resolution
- Development Economics and Appraisals
- Risk Analysis and Management
- Value Analysis and Management
- Legal Support Services
- Capital Allowances Taxation Assistance
- Quality Management Consultancy and Training
- Research and Consultancy
- Due Diligence
- Mechanical and Electrical Quantity Surveying
- Reinstatement Cost Assessment
- Sustainable Development

In pace with the rapid development of construction technology and management skill, L&S also has specialist teams which focus on particular building types and procurement routes (Figure 0.1).

Our core values

We are committed to four core values in everything we do

Integrity: We perform business in an honest and responsible way, working to the highest professional standards.
Client Focus: We are entrepreneurial and agile, passionate about creating value for our clients and achieving high performance.
Collaboration: We believe in diversity, the power of global teamwork and that by working as one can deliver exceptional outcomes.
Sustainability: We own the responsibility to sustain our world and society in a balanced way with health, safety and well-being of our people central to all we do.

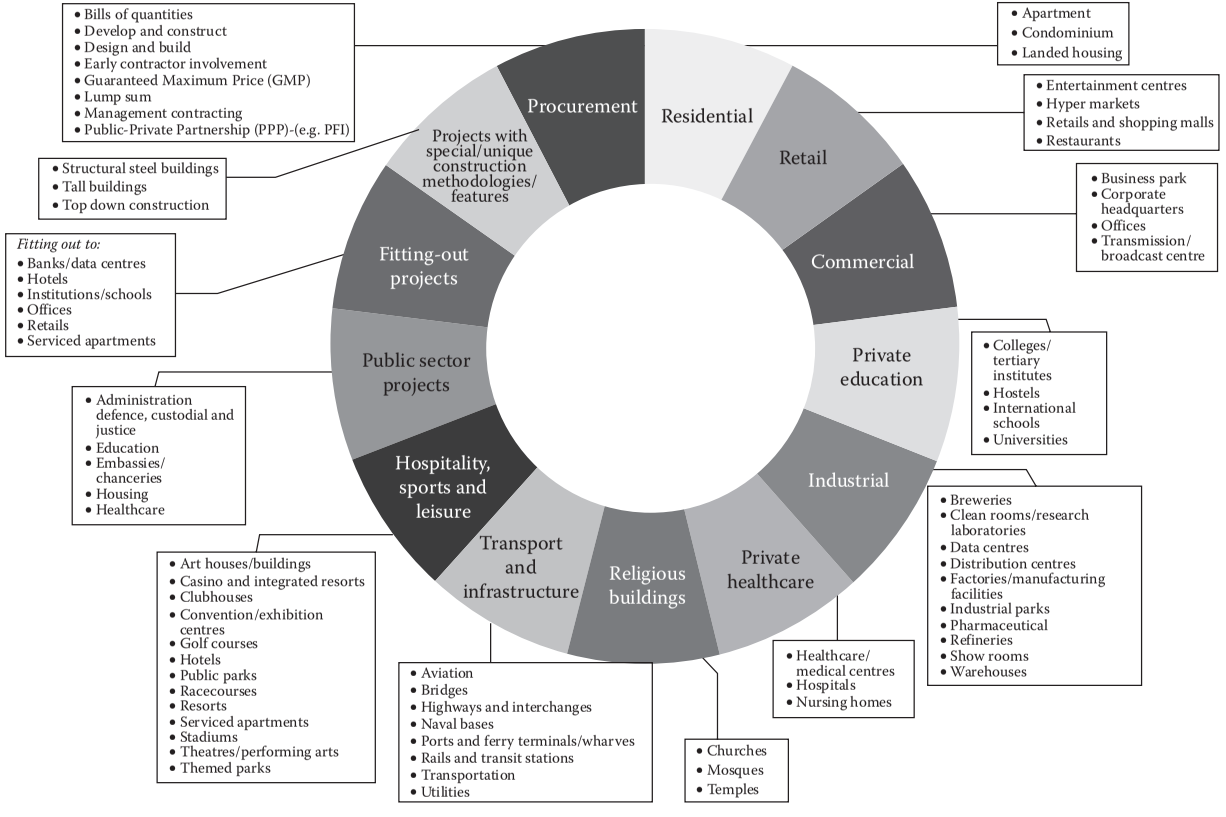

Figure 0.1 Skills and knowledge.

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Part I

Regional overview

Chapter 1

The construction industry in the Asia Pacific region

INTRODUCTION

Spon's Asia-Pacific Construction Costs Handbook: 5th Edition provides overarching construction cost data for 16 countries that include – Brunei, Cambodia, China, Hong Kong, India, Indonesia, Japan, Malaysia, Myanmar, Philippines, Singapore, South Korea, Sri Lanka, Taiwan, Thailand and Vietnam (Figure 1.1).

It contains a regional overview of the construction industry in the Asia Pacific region as well as broad and macroeconomic data on key national indicators, construction output indicators and general construction cost data.

Over the last few years, the global economic outlook has continued to be shrouded in uncertainty and volatility not least following the financial crisis in the Euro zone. The world economic landscape and tendering climate have also changed. Updated information is therefore important and even crucial. While the United States and Europe are going through a difficult period, investors are turning more keenly to focus on Asia.

This introduction describes the international groupings of the countries, their key characteristics and various measures of their standard of living. The section on Construction Output and the Economy relates value of construction output to gross domestic product (GDP) and to levels of investment for each country. It includes some data on housing stock. Finally there is a section on the Organisation of the Construction Sector.

The main active regional grouping is the Association of South East Asian Nations (ASEAN) established in 1967 with the aims of accelerating economic growth, social progress and cultural development; the promotion of collaboration and mutual assistance in matters of common interest; and the continuing stability of the region.

The selection of the countries included in this book is in part based on their importance and in part on the availability of data both published and unpublished. Table 1.1 lists the countries, indicating their membership of international groupings and whether they have formal Langdon & Seah (L&S) offices.

Figure 1.1 Asia map. (From www.cia.gov.)

Table 1.2, in summarising the key characteristics of the countries included in this volume, highlights their diversity. Populations range from around 400,000 in Brunei to more than 1.3 billion in China. The smallest country in terms of area is Singapore, followed by Hong Kong (Special Administrative Region of the People's Republic of China) and the largest, China, followed by India. Density of population is high in the smallest countries but only 141 persons per square kilometre in China and 386 in India. Definitions of the statistical terms in Table 1.2 and others used in this book are discussed in Part II, Chapter 2.

Because of the need to use monetary values in a common currency, GDP at nominal exchange rates is not always the best indicator of standard of living. Table 1.3 compares the money value of GDP per capita with estimates of GDP per capita on a purchasing power parity (PPP) basis, that is an approximation to what the GDP per capita will actually

Table 1.1 Membership of intergovernmental organisations and L&S representation

Country	*ASEAN*	*OECD*	*L&S offices*
Brunei	X		X
Cambodia	X		
China			X
Hong Kong			X
India			X
Indonesia	X		X
Japan		X	
Malaysia	X		X
Myanmar	X		
Philippines	X		X
Singapore	X		X
South Korea		X	X
Sri Lanka			
Taiwan			
Thailand	X		X
Vietnam	X		X

Source: 'Members and partners' from OECD official website http://www.oecd.org, accessed on 12 August 2014 and Association of Southeast Asian Nations (ASEAN).

Table 1.2 Key characteristics of countries

Country	*Population (million)*	*Land area (000 km²)*	*Population (per km²)*	*GDP US$ bn 2013*	*GDP per capita US$ 2013*
Brunei	0.4	5.27	80.28	22.25	54,800.00
Cambodia	15.4	181.04	85.12	13.84	992.73
China	1,361.0	9,600.00	141.77	9,294.93	6,829.41
Hong Kong	7.2	1.11	6,516.25	270.58	37,642.32
India	1,270.0	3,287.59	386.30	1,841.70	1,106.80
Indonesia	251.2	1,890.75	132.86	729.26	2,953.67
Japan	127.2	377.84	336.65	4,633.33	36,343.14
Malaysia	29.9	330.25	90.54	245.02	8,181.93
Myanmar	52.8	676.59	78.04	53.83	882.75
Philippines	92.3	300.00	307.77	266.21	2,711.20
Singapore	5.4	0.72	7,540.85	291.12	55,240.00
South Korea	49.2	99.68	493.59	1,198.17	23,290.96
Sri Lanka	20.5	65.61	312.45	66.21	3,232.57
Taiwan	23.4	36.19	645.72	490.18	20,997.77
Thailand	64.9	514.00	126.21	374.59	5,774.62
Vietnam	89.7	310.07	289.32	169.84	1,900.00

Table 1.3 GDP per capita on a PPP and money basis, 2013

Country	*GDP per capita on PPP basis[b] US$*	*Index USA = 100[a]*	*Rank order*	*GDP per capita US$*	*Rank order*
Brunei	54,800	103.79	2	54,800.00	2
Cambodia	2,600	4.92	15	992.73	15
China	9,800	18.56	9	6,829.41	8
Hong Kong	52,700	99.81	3	37,642.32	3
India	4,000	7.58	13	1,106.80	14
Indonesia	5,200	9.85	11	2,953.67	11
Japan	37,100	70.27	5	36,343.14	4
Malaysia	17,500	33.14	7	8,181.93	7
Myanmar	1,700	3.22	16	882.75	16
Philippines	4,700	8.90	12	2,711.20	12
Singapore	62,400	118.18	1	55,240.00	1
South Korea	33,200	62.88	6	23,290.96	5
Sri Lanka	6,500	12.31	10	3,232.57	10
Taiwan	39,600	75.00	4	20,997.77	6
Thailand	9,900	18.75	8	5,774.62	9
Vietnam	4,000	7.58	13	1,900.00	13

[a] USA's GDP per capital on PPP basis = US$52,800 (index at 100).
[b] Source: www.cia.gov.

Table 1.4 Selected non-monetary indicators of development

Country	*Population (million)*	*Internet users 2009*	*Internet users as a % of population*	*Infant mortality rate (per 1000 live births) 2014*
Brunei	0.4	314,900	78.7	10.48
Cambodia	15.4	78,500	0.5	51.36
China	1,361.0	389,000,000	28.6	14.79
Hong Kong	7.2	4,873,000	67.7	2.73
India	1,270.0	61,338,000	4.8	43.19
Indonesia	251.2	20,000,000	8.0	25.16
Japan	127.2	99,182,000	78.0	2.13
Malaysia	29.9	15,355,000	51.4	13.69
Myanmar	52.8	110,000	0.2	44.91
Philippines	92.3	8,278,000	9.0	17.64
Singapore	5.4	3,235,000	59.9	2.53
South Korea	49.2	39,400,000	80.1	3.93
Sri Lanka	20.5	1,777,000	8.7	9.02
Taiwan	23.4	16,147,000	69.0	4.49
Thailand	64.9	17,483,000	26.9	9.86
Vietnam	89.7	23,382,000	26.1	18.99

Source: www.cia.gov.

Table 1.5 Foreign debt and investment

Country	*External debt as a % of GDP 2012/2013*[a]	*Gross domestic investment as a % of GDP*
Brunei	–	14.6
Cambodia	35.5	23.5
China	9.3	54.4
Hong Kong	428.3	25.5
India	22.4	–
Indonesia	30.7	33.2
Japan	65.1	20.6
Malaysia	40.9	28.7
Myanmar	10.0	22.7
Philippines	27.4	22.6
Singapore	403.3	–
South Korea	36.0	28.8
Sri Lanka	50.9	29.6
Taiwan	29.9	19.9
Thailand	38.1	29.9
Vietnam	40.3	30.4

[a] Source: www.cia.gov.

buy in the respective countries. In Table 1.3, the countries are arranged as in Table 1.2 but in fact it is clear that on a PPP basis the order changes noticeably.

Other factors are also relevant in assessing the standard of living and quality of life. Table 1.4 shows some non-monetary indicators of development.

None of the factors reviewed above indicates the financial viability of the economies. Table 1.5 shows external debt and gross domestic investment, both as a percentage of GDP, for the countries for which information is available.

CONSTRUCTION OUTPUT AND THE ECONOMY

Table 1.6 shows the relationships of investment, gross construction output and net construction output to GDP and to each other. Gross output is the total value of construction produced; net output is gross output minus the inputs from other industries (see Statistical Notes in Chapter 2). These inputs are mainly materials but also plant and equipment and other goods or services. Thus net output consists mainly of labour, management costs and profits.

Table 1.6 Investment and construction output related to GDP

Country	*Net construction output as a % of GDP*	*Gross construction output as a % of GDP*	*Net construction output as a % of gross output*	*Gross domestic investment as a % of GDP*
Brunei	–	1.9	–	14.6
Cambodia	6.5	–	–	23.5
China	6.9	28.0	24.5	54.4
Hong Kong	2.3	8.4	21.4	25.5
India	–	–	–	–
Indonesia	5.0	8.9	49.1	33.2
Japan	–	9.6	–	20.6
Malaysia	3.7	–	–	28.7
Myanmar	4.8	–	–	22.7
Philippines	3.3	7.9	41.9	22.6
Singapore	4.7	9.3	51.0	–
South Korea	13.0	18.3	70.1	28.8
Sri Lanka	8.9	10.3	31.6	29.6
Taiwan	2.7	2.8	94.5	19.9
Thailand	2.4	–	–	29.9
Vietnam	5.8	21.5	–	30.4

The gross and net output figures are those contained in the country sections. For some countries, a considerable amount of estimation is involved. Generally, the national accounts contain estimates of the contribution of construction to GDP which is net output. It is often difficult to obtain estimates of gross construction output for developing countries. Because of the difficulty in gathering data on construction, any figures of gross and net output are subject to considerable margins of error. These are a result of large numbers of small projects particularly in renovation and repair and maintenance; the wide geographical distribution of construction activity; the fact that the price of a construction project is not always determined in one operation and changes may not be recorded; and the large number of construction clients and construction firms.

It is possible, however, to make estimates of gross output especially if data for net output and investment are available. The relationship between gross construction output and net construction output depends on:

- The work mix. Some work is more labour intensive than the other.
- The sophistication of construction including the extent of use of capital equipment.
- Wage rates and productivity.

Thus, a country which has low wage rates and high productivity would be expected to have low net output in relation to gross output but in fact low wage rates are often combined with low productivity so that the effects to some extent cancel each other out. A country with a sophisticated construction product probably uses a high level of equipment and expensive materials so that the tendency would be for net output to be a low proportion of gross output. Such country, however, probably also has high wage rates and high productivity thus compensating to some extent for the high input costs. In general, the proportion of net output of gross output is around 50%.

Another factor to be taken into account is the relationship between construction new work output and total investment. In most countries, construction accounts for about half of all investment and is likely to be higher in less developed countries than in developed ones because the construction industry provides much of the very basic infrastructure.

Where the authors have estimated gross output they have generally done so by estimating the percentage which it is likely to take of GDP, bearing in mind the proportion accounted for by net output and by total investment.

Considering the individual countries in Table 1.6, the preceding general statements may be seen reflected in the figures.

Table 1.7 Number of construction companies in top 250 international companies

Country	*Number of construction companies in top 250 companies*
Brunei	–
Cambodia	–
China	55
Hong Kong	–
India	4
Indonesia	–
Japan	15
Malaysia	–
Myanmar	–
Philippines	–
Singapore	–
South Korea	15
Sri Lanka	–
Taiwan	1
Thailand	1
Vietnam	–

Source: www.enr.construction.com.

TOP 250 INTERNATIONAL CONSTRUCTION COMPANIES (2013)

Every year, the Engineering News Record (ENR) ranks the 250 largest construction contracting companies from around the world. Table 1.7 shows the number of construction companies that are listed in the 2013 ENR's Top 250 International Construction Companies for the following countries. The companies are ranked according to construction revenue generated outside of each company's home country in 2012 in US dollars.

It can be seen that China, Japan and South Korea have a large number of construction companies that operate internationally.

Part II

Individual countries

Chapter 2

Introductory notes to country sections

INTRODUCTION

In this part of the book, 16 countries are arranged alphabetically, and each country is presented as far as possible in a similar format, under five main headings – Key data, The construction industry, Construction cost data, Exchange rates and inflation and Useful addresses. These notes introduce the five main sets of information presented on the individual countries and provide, in one place, general notes, definitions and explanations, in order to keep the individual country sections as succinct as possible. A final heading, Statistical notes, discusses and explains the statistical definitions and concepts adopted in the book.

KEY DATA

The key data sheet at the start of each country lists main population, geographic, economic and construction indicators and thus provides a brief statistical overview of that country. In many cases data produced by national statistical offices have been used; in other cases, UN or World Bank sources have been relied on. Some estimates are included for construction data especially for gross construction output. The methods are discussed in Part I – The construction industry in the Asia Pacific region. In Part III, Comparative data, international agency data have been used throughout in order to ensure consistency. Further notes on economic indicators are provided below in the Statistical notes.

THE CONSTRUCTION INDUSTRY

The main topics covered in this section are the contribution of the industry to the economy; the structure of the industry; the availability of and

constraints on construction labour and materials; tendering and contract procedures and standards.

Although construction is often fragmented and tends to be labour intensive, it is invariably the single largest industry in a country. In most countries the net output of construction contributes between 2% and 13% to Gross Domestic Product (GDP) and a similar percentage to direct construction employment (indirect employment – in the construction materials industries and other related activities – can more than double the contribution). Gross construction output including materials and plant and equipment is normally around twice net output but the range is quite wide and the reasons are discussed in Part I – The construction industry in the Asia Pacific region.

CONSTRUCTION COST DATA

This section includes both construction costs incurred by contractors and the costs they charge their clients. The costs of labour and materials are input costs of construction, that is, the costs incurred by contractors.

Unit costs, measured rates for construction work and approximate estimating costs per square metre are output costs, that is, the costs contractors charge their clients. Problems of definition make meaningful and consistent presentation of unit rates extremely difficult. For unit rates to be useful it is essential to be clear what is included and what is excluded. Notes are provided in each country section, for example, on the treatment of preliminary items and on the methods of measurement adopted for approximate estimating rates per square metre.

Cost of labour and materials

Typical costs for construction labour and materials are given in most country sections. Two figures are generally given for each grade of labour. The wage rate is the basis of an employee's income – his basic weekly wage will be the number of hours worked multiplied by his wage rate. The cost of labour, on the other hand, is the cost to the employer of employing that employee; it is also based on the wage rate but includes (where applicable) allowances for:

- Incentive payments
- Travelling time and fares
- Lodging and subsistence
- Public and annual holidays with pay
- Training levies
- Employer's liability and third-party insurances

- Health insurance
- Payroll taxes
- Other mandatory and voluntary payments

The costs of main construction materials are given as delivered to site in quantities appropriate to a reasonably substantial building project. It is presumed that there are no particular difficulties of access which would significantly affect costs. Generally tax, and particularly any value added tax or goods and services tax, is excluded from material costs mainly because the rate of tax to be levied may depend on the type of work in which the material is to be incorporated.

Unit rates

Rates for a variety of commonly occurring construction items are provided for most countries. They are usually based on a major, if not the capital, city and the relevant date is always fourth quarter of 2013. Rates generally include all necessary labour, materials, plant and equipment and, where appropriate, allowances for contractors' overheads and profit, preliminary and general items associated with site set-up, and so on and contractors' profit and attendance on specialist trades. Where the basis of rates is different from this, notes are provided in the text in each country section. Value added tax/goods and services tax and other taxes are excluded. The rates are appropriate to a reasonably substantial building project.

In the country sections, abbreviated descriptions are given for each work item; a full description of each work item is presented in Chapter 19.

Approximate estimating

Approximate estimating costs per unit area (square metre and square feet) are given for most countries for a variety of building types. Notes on the method of measurement and what is or is not included in unit rates are provided in each country section. Areas generally are measured on all floors between external walls and without deduction for internal walls, columns and so forth. Generally tax, and particularly value added tax/goods and services tax, is excluded from the approximate estimating costs.

When making comparisons of construction costs between countries, it is important to be clear about what is being compared. There are two main methods of comparison: first the comparison of identical buildings in each country and, second, the comparison of functionally similar buildings in each country. In the country sections, the approximate estimating rates given are for the standard of building of each type normally built in that country. Rates are therefore closer to the 'functionally similar' approach. The rate per square metre given for an office building, for example, or a warehouse

in any particular country refers to the normal type of office building or warehouse built in that country. In country sections they are presented in national currencies. Selections of approximate estimating costs are also presented in pound sterling, US dollar and Japanese yen equivalents in Part III thus enabling comparisons on a common currency basis to be made.

EXCHANGE RATES AND INFLATION

Exchange rates

Currency exchange rates are important when comparing costs between one country and another. While it is most useful to consider costs within a country in that country's currency, it is necessary, from time to time, to use a common currency in order to compare one country's costs with another. But exchange rates can fluctuate dramatically and few currencies (even those considered strong) can be considered really stable. It can be risky to think in terms, for example, of one country being consistently a set percentage more or less expensive than another.

Different rates of internal inflation affect the relative values of currencies and, therefore, the rates of exchange between them. However, the reasons behind exchange rate fluctuations are complex and often political as much as economic; they include such factors as interest rates, balance of payments, trade figures and, of course, government intervention in the foreign exchange markets, and, for that matter, other government actions.

Graphs of exchange rates since 2003 against the pound sterling, euro, the US dollar and the Japanese yen are included for all countries. They have been calculated by averaging the published monthly values in each year. The values given are therefore smoothed – the most dramatic peaks and troughs have been ironed out. They are, however, useful for indicating long-term trends. As far as possible, the form of the graph is kept the same; with the vertical scale adjusted to accommodate different currencies. It should always be checked whether marked movement in a graph is a result of erratic exchange rates or merely the selected vertical scale.

If a line moves up from left to right (e.g. the Indian Rupee against the Pound Sterling – see Figure 2.1) it indicates that the subject currency (the Indian Rupee) is declining in value against the currency of the line (the Pound Sterling). The higher the line is, the more subject currency is required to purchase the line currency. If, on the other hand, a line moves down from left to right (e.g. the Malaysian Ringgit against the Pound Sterling – see Figure 2.2) it indicates the subject currency is strengthening against the line currency. Where there is virtually no movement at all, that is the line is horizontal, this usually indicates a currency effectively 'tied' or 'pegged' to the line currency.

Figure 2.1 Exchange rates graph (Indian rupee).

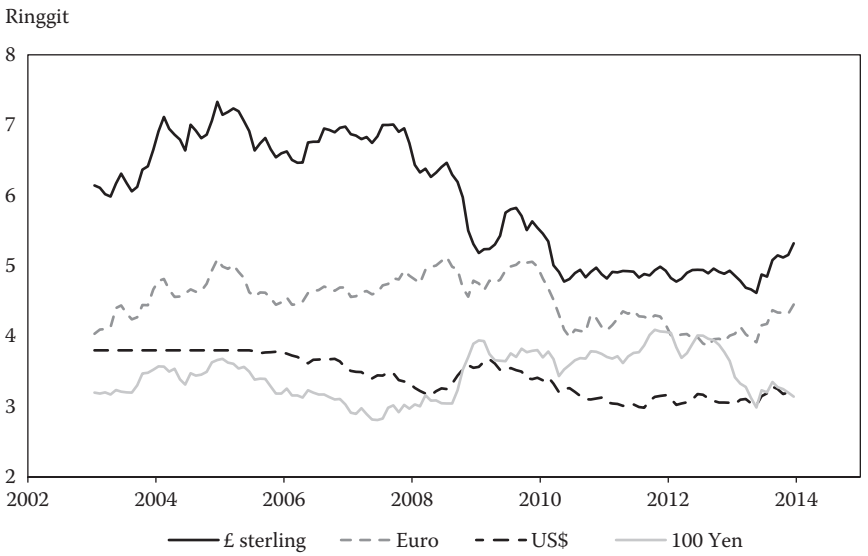

Figure 2.2 Exchange rates graph (Malaysian Ringgit).

Inflation

General inflation has been measured using consumer or retail price indices. These reflect price changes in a basket of goods and services weighted according to the spending patterns of a typical family. Weights are changed periodically, and new items are inserted. General inflation indices usually rise and, in so doing, erode the purchasing power of a given currency unit. Other measures of inflation tend to be related to specific items. The two most commonly prepared for the construction industry are discussed below.

Cost and tender price indices measure different types of inflation which occur within the construction industry. Building costs are the costs actually incurred by a contractor in the course of his business, the major ones being labour and materials; tender prices are the prices for which a contractor offers to erect a building. Tender prices include building costs but also take into account the prevailing market situation. When there is plenty of construction work, tender prices may increase at a greater rate than building costs while, when work is scarce, tender prices may actually fall even if building costs are rising.

Most countries have building cost indices – the method of compilation is generally relatively simple, basically comprising a weighted basket of the main inputs to construction. Rather fewer countries have tender price indices – their method of compilation is more complex usually involving a detailed analysis of accepted tenders for construction work and comparing these with a common base schedule of prices. When construction indices are described as price indices, it is not always clear what these are.

USEFUL ADDRESSES

At the end of each country section, a list of addresses is given. This usually comprises main Government, contracting, professional, standards and research organisations involved in the construction industry.

STATISTICAL NOTES

GDP is the total value of all the goods and services produced in a country. It shows the wealth generated within a country. Gross National Product (GNP) is the total value of all the goods and services produced in a country plus or minus net income from outside. Thus it represents the total amount of income available to the population. Reasons why GNP can be greater than GDP include that nationals abroad send back money, that the country receives aid or that the country has an income from

investments abroad. Debt repayment and payment of interest can make GNP less than GDP.

It is appropriate to use GNP as a measure of wealth when income is being considered, for example, in allocation for various purposes. GDP is more appropriate where productive capacity is being considered. Because a primary focus of this book is on the productive capacity of the construction industry in the key data sheets for each country the emphasis is on GDP, although there are a few countries where only statistics of GNP are available.

In considering expenditure, the data for private and public consumption and investment are expressed as a proportion of GDP. This is partly because the main source for this expresses it this way and use of this one source gives a consistent picture. Because expenditure is made out of GNP, the three percentages do not always total to 100.

Data on construction output for most countries are available in the form of net output or value added, that is, broadly, gross value of construction output minus the value of the material input, and the cost of plant and equipment. However, the method of arriving at these data and gross value of construction output varies from country to country and is sometimes so indirect that it is of dubious reliability/quality. Both gross and net construction output are given where possible. The authors have made estimates based on relationships to other indicators and past data of gross output where reliable data are not available and have for some countries also estimated net output.

The exchange rates given in the key data are those which are appropriate for use with the cost data. For conversion of figures for a year, for example, GDP in 2013, the 4th Quarter exchange rate has been used. Because a single yen has a small value compared to the US dollar or the pound sterling, a rate for 100 yen is given in each case. Purchasing power parity (PPP) is the exchange rate which would be appropriate to express an income in one country in terms of its purchasing power in another country.

All the statistics are subject to considerable margins of error but particularly so for the less developed countries. As soon as they are converted from national currencies to US$ in order to permit comparison, the difficulty arises that the exchange rate may not reflect the PPP. In using exchange rates to convert value of construction output, the difficulty is greater because of the greater specificity of production. The statistics sometimes do not reflect the real situation, and this is the problem which exists in a greater or lesser degree for all countries. Indeed even taking authoritative sources, variations of a factor of eight are possible. Table 1.3 in Chapter 1 shows a comparison of GDP per capita on a PPP and money basis. The statistics in this volume are those considered by the editors to be as accurate and as representative of the real situation as possible.

Chapter 3

Brunei Darussalam

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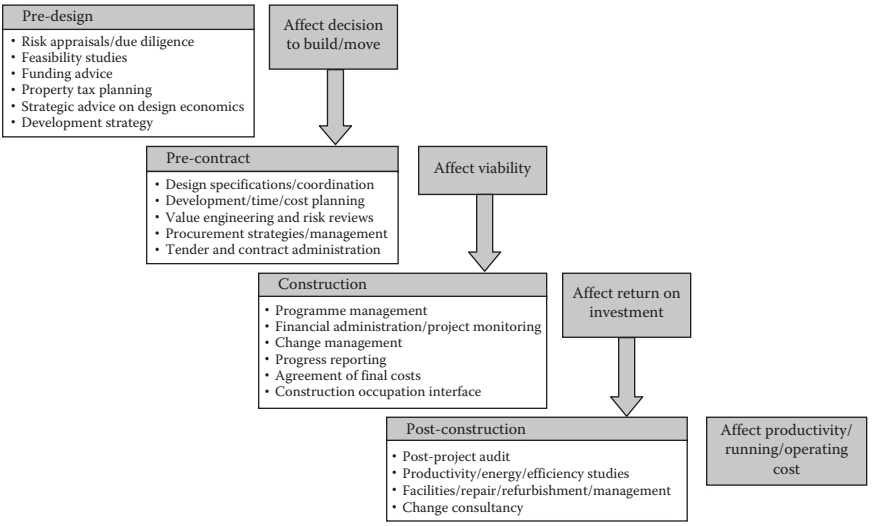
TYPICAL PROJECT STAGES, INTEGRATED SERVICES AND THEIR EFFECT



INTERNATIONAL EXPERTISE LOCAL DELIVERY

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Unit 25, BT Complex
Kg. Jaya Setia
Mukim Berakas 'A' BB2713
PO Box 313
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Negara Brunei Darussalam
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Kuala Belait KA 1189
Negara Brunei Darussalam
Tel: (673) 334 7878
Fax: (673) 334 7788

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All data relate to 2014 unless otherwise indicated.

Population	
Population	422,675
Urban population	76.00%
Population under 15	24.2%
Population 65 and over	4.00%
Average annual growth rate	1.65%
Geography	
Land area	5,265 km^2
Agricultural area	0.52%
Capital city	Bandar Seri Begawan
Population of capital city (2011)	241,000
Economy	
Monetary unit	Brunei Dollar (B$)
Exchange rate (average fourth quarter 2013) to:	
The pound sterling	B$1.99
The US dollar	B$1.24
The euro	B$1.67
The yen × 100	B$1.24
Average annual inflation (2013)	1.0%
Inflation rate (2013)	1.0%
Gross domestic product (GDP) (2013)	USD$22.25 bn
GDP per capita (2013)	USD$54,800
Average annual real change in (GDP)	2.2%
Private consumption as a proportion of GDP	22.1%
Public consumption as a proportion of GDP	18.2%
Investment as a proportion of GDP (2013)	14.6%
Construction	
Gross value of construction output	B$525.3 mil
Net value of construction output	–
Gross value of construction output as a proportion of GDP	1.9%

Note: All GDP values above are based on current prices as at 2014 except for average annual real change in GDP which is based on constant prices with year 2007 as base year.

THE CONSTRUCTION INDUSTRY

Construction output

The value of the gross output of the construction industry in 2012 based on current prices as at 2000 was B$614.60 million, equivalent to 2.9% of GDP.

Brunei is heavily reliant on its oil and gas sector which accounts for more than 95% of the country's export receipts. Its contribution to GDP has, however, fallen from about 70% in the early 1980s to 66.72% in 2012 due to the official policy on diversification. The non-oil sector comprising the Government and the non-oil private sector have increased by 5.90% growth in 2012.

Although the contribution of construction to GDP is small in relation to the other sectors, it remains an important sector of the economy. Statistics on construction output at current prices are shown in Table 3.1.

The level of construction activity is heavily dependent on government development projects. Under the *Ninth National Development Plan for the period between 2007 and 2012*, the overall expenditure allocated for development is B$9,500 million. The proposed main expenditure items are shown in Table 3.2.

Public housing and public utilities continue to be the emphasis under this *National Development Plan* as was the case in the past plans. In addition, emphasis has been given to Info-communication technology in both the eighth and the ninth national development plans covering an overall percentage of 15.7% and 12.1%, respectively, of the total allocation.

Table 3.1 Gross domestic product and construction output, 2007–2012

Year	*Gross domestic product B$ million*	*Construction output B$ million*	*% of gross domestic product*
2007	18,458.40	530.40	2.9
2008	20,397.90	534.40	2.6
2009	15,611.40	518.10	3.3
2010	16,867.30	524.10	3.1
2011	20,579.20	550.20	2.7
2012	21,185.10	614.60	2.9

Source: Department of Statistics, Department of Economic Planning and Development.

Note: The above values are based on current prices with year 2000 as base year.

Table 3.2 Main expenditure items under Ninth National Development Plan for the period 2007–2012

Type of work	*B$ million*	*% of total*
Government and national housing	1,578.9	16.6
Public utilities	1,492.7	15.7
Info-communication technology	1,145.7	12.1
Educational facilities	822.5	8.7
Industrial and commercial development	725.8	7.6
Public buildings	672.9	7.1
Roads	568.5	6.0
Telecommunications (incl. radio, TV and postal)	357.2	3.8
Muara Besar Island Development	299.1	3.1
Public facilities and environment	182.5	1.9
Science and technology and research and development	165.1	1.7
Medical and health	149.1	1.6
Civil aviation, marine and ports	141.3	1.5
Others	1,198.7	12.6
Total	9,500	100

Source: Brunei Darussalam Long Term Development Plan.

Characteristics and structure of the industry

The Ministry of Development which was set up in 1984 is responsible for all construction activities. It consists of seven units and six departments including the Public Works Department (PWD), which is further sub-divided into seven departments. The Ministry provides a range of services from human resource training to basic infrastructure development. The main departments are as follows:

- The PWD is responsible for the planning, design, implementation and construction of various government projects such as bridges, roads, water and sewerage. The PWD disseminates its services through its seven departments namely Department of Administration and Finance, Department of Building Services, Department of Development, Department of Drainage and Sewerage, Department of Road, Department of Technical Services and Department of Water Services.
- The Housing Development Department is in charge with implementing the government's objective for every citizen to own a house. The department is also responsible for the management and controlling

of buildings in the National Housing Scheme and Landless Citizens Scheme area.
- The Land Department is responsible for registration of privately owned land.
- The Survey Department is responsible for surveys throughout the country. In addition, this department also processes applications related to land sub-division and consolidation, creates and maintains digital topographical database and produces customised digital maps and orthophoto maps.
- The Town and Country Planning Department is responsible for land use planning and control, covering structure, action and local development plans. This department acts as an advisory to government agencies and developers on physical planning matters and processes all earthwork and building applications within the development control areas.
- The Department of Environment, Parks and Recreation was formed in 2002. The department acts as a regulatory agency for environmental acts and regulations and is responsible for development and implementation of environmental protection policies and programme.

The units within the Ministry include the following:

- Construction Planning and Research Unit
- Research and Development Unit
- Bumiputra Guidance and Development Unit
- Lands Unit
- Housing Unit
- Financial Regulation Unit
- Istana Maintenance Unit

The Ministry of Development, through its Bumiputra Guidance and Development Unit, registers contractors and suppliers under the following classes (Table 3.3).

There are seven work categories as follows which a contractor or supplier can apply for registration.

Table 3.3 Classes of contractors and suppliers

Class	*Minimum paid up capital*	*Limit of contract value of project*
I	B$4,000.00	Up to B$25,000
II	B$10,000.00	B$25,000–B$150,000
III	B$50,000.00	B$150,000–B$500,000
IV	B$250,000.00	B$500,000–B$1,500,000
V	B$500,000.00	B$1,500,000–B$5,000,000
VI	B$1,000,000.00	Above B$5,000,000

- Civil engineering works
- Building construction works
- Mechanical (consist of three sub-categories)
- Electrical (consist of three sub-categories)
- Construction specialist (consist of twelve sub-categories)
- Mechanical specialist (consist of four sub-categories)
- Supplies (consist of six sub-categories)
- Services (consist of three sub-categories)

Plans for development approval to the Town and Country Planning Department, Land Department, Development Control Unit (PWD), Municipal Board or District Offices are submitted by qualified persons. There are two categories of qualified persons: those able to submit plans for a maximum of four residential units only and those who can submit plans for all types of buildings.

Clients and finance

The industry is very dependent on public sector projects. Government expenditure allocations are set out in five-year *National Development Plans* which aim at reducing reliance on oil and gas income and increase private sector participation in the economy. Most construction and civil engineering work from the public sector is administered by the Ministry of Development.

Of the private sector clients, the most prominent are Brunei Shell Petroleum Sdn Bhd and a few local property developers who concentrate on providing residential, retail and commercial space. These developers are mainly self-financed or receive assistance from local banks. There are a lot of small construction projects providing private housing where finance is often obtained from local commercial banks through personal loans.

Development control and standards

The development of land and building is basically controlled by three different Government bodies in their respective control areas, namely Municipal Board, Development Control Competent Authority and Land Department.

The Development Control Competent Authority (DCCA) established and mandated under the Town and Country Planning Act 1972 regulates, plans, coordinates, controls and approves any land or building development within the declared development control areas.

Applications for private land or building developments are received, processed and approved by the Development Control Unit (DCU). Upon completion of the project, the DCU carries out a joint inspection with the other

members of the approving authority, and gives recommendation to enable an occupancy permit to be issued by the approving authority.

Piawai Brunei Darussalam (PBD) standards and Guidance Documents (GD) are developed and published by the Ministry of Development, through its Construction Planning and Research Unit, to maintain quality and consistency in materials and workmanship in the industry.

CONSTRUCTION COST DATA

Cost of labour

The figures that follow are typical of labour costs in Bandar Seri Begawan as at the fourth quarter of 2013. The wage rate is the basis of an employee's income, while the cost of labour indicates the cost to a contractor of employing that employee. The difference between the two covers a variety of mandatory and voluntary contributions – a list of items which could be included is given in Chapter 2.

	Wage rate (per day) B$	*Cost of labour (per day) B$*	*Number of hours worked per year*
Site operatives			
Mason/bricklayer	32–48	38–58	2,600
Carpenter	32–48	38–58	2,600
Plumber	32–48	38–58	2,600
Electrician	40–56	48–67	2,600
Structural steel erector	32–48	38–58	2,600
Semi-skilled worker	25–40	30–48	2,600
Unskilled labourer	18–33	22–40	2,600
Equipment operator	32–48	38–58	2,600
Watchman/security	35–55	42–66	2,600
Site supervision	*(per month)*	*(per month)*	
General foreman	2,500–3,000	4,500–7,500	2,600
Trades foreman	2,500–3,000	2,500–3,500	2,600
Clerk of works	1,200–2,400	1,800–3,300	2,600
Contractors' personnel			
Site manager	5,000–7,000	6,000–9,000	2,500–2,600
Resident engineer	4,000–5,000	4,800–6,000	2,500–2,600
Resident surveyor	2,500–3,000	3,000–4,000	2,500–2,600
Junior engineer	1,700–2,500	2,000–3,000	2,500–2,600
Junior surveyor	1,700–2,500	2,000–3,000	2,500–2,600
Planner	2,500–2,800	3,000–4,000	2,500–2,600

Continued

	Wage rate (per month) B$	*Cost of labour (per month) B$*	*Number of hours worked per year*
Consultants' personnel			
Senior architect	4,500–5,500	6,500–7,500	2,040
Senior engineer	4,500–5,500	6,500–7,500	2,040
Senior surveyor	4,000–5,000	6,000–7,000	2,040
Qualified architect	3,000–4,000	5,000–6,000	2,040
Qualified engineer	3,000–4,000	5,000–6,000	2,040
Qualified surveyor	3,000–4,000	5,000–6,000	2,040

Cost of materials

The figures that follow are the costs of main construction materials, delivered to site in the Bandar Seri Begawan area, as incurred by contractors in the fourth quarter of 2013 (unless otherwise stated). These assume that the materials would be in quantities as required for a medium-sized construction project and that the location of the works would be neither constrained nor remote.

	Unit	*Cost B$*
Cement and aggregate		
Ordinary Portland cement in 50 kg bags	tonne	203.00
Coarse aggregates for concrete	m^3	45.00
Fine aggregates for concrete	m^3	45.00
Ready mixed concrete (1:2:4) Grade 20	m^3	120.00
Ready mixed concrete (1:1.5:3) Grade 25	m^3	125.00
Ready mixed concrete (1:1:2) Grade 30	m^3	129.00
Steel		
Mild steel reinforcement	tonne	860.00
High tensile steel reinforcement	tonne	890.00
Structural steel sections	tonne	3,100.00
Bricks and blocks		
Common bricks (4″ × 9″ × 3″)	each	0.18
Hollow concrete blocks (6″ × 9″ × 4″)	each	0.88
Solid concrete blocks (4″ × 9″ × 3″)[a]	each	3.30
Glass blocks (8″ × 8″ × 3 7/8″)[a]	each	2.50
Timber and insulation		
Kapur bukit timber (Sawn)	tonne	1,183.00

Continued

	Unit	*Cost B$*
Kapur bukit timber (Wrot)	tonne	1,450.00
Red Meranti timber (Sawn)	tonne	697.00
Red Meranti timber (Wrot)	tonne	800.00
Exterior quality plywood (12 mm thick)[a]	m^2	32.00
Plywood for interior joinery (6 mm thick)[a]	m^2	16.00
Teak parquet flooring[a]	m^2	43.26
Chipboard sheet flooring (12 mm thick)	m^2	N/A
100 mm thick quilt insulation[a]	m^2	5.46
Aluminium insulation foil[a]	m^2	2.74
Softwood internal quality door (single leaf) complete with frames and ironmongery	each	450.00
Gypsum board (9 mm thick)	m^2	28.00
Glass and ceramics		
Tinted laminated glass (8 mm thick)	m^2	230.00
Tinted float glass (10 mm thick)	m^2	100.00
Tinted float glass (6 mm thick)	m^2	60.00
Sealed double glazing units (50 mm)	m^2	400.00
Plaster and paint		
Good quality ceramic wall tiles (8″ × 8″)[a]	m^2	36.08
Plasterboard (12 mm thick)	m^2	24.50
Emulsion paint in 5 litre tins	litre	3.00
Gloss oil paint in 5 litre tins	litre	7.60
Tiles and paviors		
Clay floor tiles (8″ × 4″ × 0.5″)	m^2	N/A
Vinyl floor tiles (12″ × 12″ × 0.125″)[a]	m^2	28.00
Precast concrete paving slabs (12″ × 12″ × 3″)	m^2	30.00
Clay roof tiles	each	3.50
Precast concrete roof tiles	each	1.50
Drainage		
WC suite complete	each	385.00
Lavatory basin complete	each	285.00
200 mm diameter vitrified clay sewer pipes	m	30.00
100 mm diameter ductile iron pipes	m	20.00
150 mm diameter ductile iron pipes	m	28.16
Drainage composite for RC drain	m^2	10.00

[a] Data from fourth quarter 2012.

Unit rates

The descriptions that follow are generally shortened versions of standard descriptions listed in full in Chapter 19. Where an item has a two-digit reference number (e.g. 05 or 33), this relates to the full description against that number in Chapter 19. Where an item has an alphabetic suffix (e.g. 12A or 34B) this indicates that the standard description has been modified. Where a modification is major the complete modified description is included here and the standard description should be ignored; where a modification is minor (e.g. the insertion of a named hardwood) the shortened description has been modified here but, in general, the full description in Chapter 19 prevails.

The unit rates below are for main work items on a typical construction project in the Bandar Seri Begawan area in the fourth quarter of 2013 (unless otherwise stated). The rates include all necessary labour, materials and equipment. Allowances to cover preliminary and general items and contractors' overheads and profit have been added to the rates.

		Unit	*Rate B$*
Excavation			
01	Mechanical excavation of foundation trenches	m^3	3.33
02	Hardcore filling making up levels[a]	m^3	40.00
03	Earthwork support	m^2	N/A
Concrete work			
04	Plain *in situ* concrete in strip foundations in trenches	m^3	160.00
05	Reinforced *in situ* concrete in beds	m^3	160.00
06	Reinforced *in situ* concrete in walls	m^3	160.00
07	Reinforced *in situ* concrete in suspended floors or roof slabs	m^3	160.00
08	Reinforced *in situ* concrete in columns	m^3	160.00
09	Reinforced *in situ* concrete in isolated beams	m^3	160.00
10	Precast concrete slab	m^2	160.00
Formwork			
11	Softwood or metal formwork to concrete walls	m^2	16.50
12	Softwood or metal formwork to concrete columns	m^2	16.50
13	Softwood or metal formwork to horizontal soffits of slabs	m^2	16.50
Reinforcement			
14	Reinforcement in concrete walls	tonne	1,100.00
15	Reinforcement in suspended concrete slabs	tonne	1,100.00
16	Fabric reinforcement in concrete beds	m^2	6.50

Continued

		Unit	*Rate B$*
Steelwork			
17	Fabricate, supply and erect steel framed structure	tonne	3,400.00
18	Framed structural steelwork in universal joist sections	tonne	3,400.00
19	Structural steelwork lattice roof trusses	tonne	3,400.00
Brickwork and blockwork			
21A	Solid (perforated) concrete blocks	m^2	58.00
22	Sand lime bricks	m^2	30.00
23	Facing bricks	m^2	42.00
Roofing			
24	Concrete interlocking roof tiles 430 × 380 mm	m^2	30.00
25	Plain clay roof tiles 260 × 160 mm	m^2	55.00
26	Fibre cement roof slates 600 × 300 mm	m^2	N/A
27	Sawn softwood roof boarding	m^2	N/A
29	Three layers glass-fibre-based bitumen felt roof covering	m^2	45.00
30	Bitumen-based mastic asphalt roof covering	m^2	32.00
33A	Troughed galvanised steel roof cladding (0.65 mm TCT)	m^2	47.00
Woodwork and metalwork			
34	Preservative-treated sawn softwood 50 × 100 mm	m	5.76
35	Preservative-treated sawn softwood 50 × 150 mm	m	8.44
36	Single glazed casement window in Nyatoh hardwood, size 650 × 900 mm	each	280.00
37	Two panel glazed door in Nyatoh hardwood, size 850 × 2000 mm	each	600.00
38	Solid core half hour fire resisting hardwood internal flush doors, size 800 × 2000 mm	each	380.00
39	Aluminium double-glazed window, size 1200 × 1200 mm	each	500.00
40	Aluminium double-glazed door, size 850 × 2100 mm	each	600.00
41	Hardwood skirtings	m	6.50
Plumbing			
42	UPVC half round eaves gutter	m	15.00
43	UPVC rainwater pipes	m	10.00
44	Light gauge copper cold water tubing	m	13.00
45	High-pressure plastic pipes for cold water supply	m	6.50
46	Low-pressure plastic pipes for cold water distribution	m	16.50

Continued

		Unit	*Rate B$*
47	UPVC soil and vent pipes	m	12.00
48	White vitreous China WC suite	each	385.00
49	White vitreous China lavatory basin	each	285.00
50	Glazed fireclay shower tray	each	280.00
51	Stainless-steel single bowl sink and double drainer	each	700.00
Electrical work			
52A	PVC insulated and copper sheathed cable (1.5 mm^2 dual core)	m	7.15
53A	13 amp switched socket outlet	each	78.00
54	Flush mounted 20 amp, 1 way light switch	each	75.00
Finishings			
55	Two coats gypsum-based plaster on brick walls	m^2	8.00
56	White glazed tiles on plaster walls	m^2	31.00
57A	Homogenous unpolished ceramic tiles to floors	m^2	34.40
58	Cement and sand screed to concrete floors	m^2	5.00
59	Thermoplastic floor tiles on screed	m^2	32.00
60	Mineral fibre tiles on concealed suspension system	m^2	17.25
Glazing			
61	Glazing to wood	m^2	29.91
Painting			
62	Emulsion on plaster walls	m^2	4.80
63	Oil paint on timber	m^2	7.60

[a] Data from second quarter 2012.

Approximate estimating

The building costs per unit area given below are averages incurred by building clients for typical buildings in the Bandar Seri Begawan area as at the fourth quarter of 2013. They are based upon the total floor area of all storeys, measured between external walls and without deduction for internal walls.

Approximate estimating costs generally include mechanical and electrical installations but exclude furniture, loose or special equipment, and external works; they also exclude fees for professional services. The costs shown are for specifications and standards appropriate to Brunei and this should be borne in mind when attempting comparisons with similarly described building types in other countries. A discussion of this issue is included in Chapter 2. Comparative data for countries covered in this publication, including construction cost data, are presented in Part III.

Approximate estimating costs must be treated with caution; they cannot provide more than a rough guide to the probable cost of the building.

	Cost m² B$	*Cost ft² B$*
Industrial buildings		
Factories for letting	560–660	52–61
Factories for owner occupation (light industrial use)	710–760	66–71
Factories for owner occupation (heavy industrial use)	860–910	80–85
Factory/office (high-tech) for letting (shell and core only)	680–730	63–68
Factory/office (high-tech) for letting (ground floor shell, first floor offices)	760–810	71–75
Factory/office (high tech) for owner occupation (controlled environment, fully finished)	1,195–1,295	111–120
High tech laboratory workshop centres (air-conditioned)	1,400–1,510	130–140
Warehouses, low bay (6–8 m high) for letting (no heating)	700–750	65–70
Cold stores/refrigerated stores	1,300–1,400	120–130
Administrative and commercial buildings		
Civic offices, non-air-conditioned	700–800	60–65
Civic offices, fully air-conditioned	870–930	74–79
Offices for letting, 5–10 storeys, non-air-conditioned	880–980	82–91
Offices for letting, 5–10 storeys, air-conditioned	1,195–1,250	111–116
Offices for owner occupation 5–10 storeys, non-air-conditioned	1,195–1,250	111–116
Offices for owner occupation 5–10 storeys, air-conditioned	1,300–1,500	121–139
Prestige/headquarters office, 5–10 storeys, air-conditioned	1,500–1,700	139–158
Health and education buildings		
General hospitals (500 beds)	1,900–2,100	176–195
Teaching hospitals (100 beds)	1,750–1,850	163–135
Private hospitals (100 beds)	1,200–1,400	111–130
Health centres	1,200–1,300	111–120
Nursery schools	700–900	65–84
Primary/junior schools	1,000–1,100	93–102
Secondary/middle schools	1,100–1,200	102–11
Management training centres	1,150–1,250	107–116
Recreation and arts buildings		
Theatres (>500 seats) including seating and stage equipment	3,300–3,700	307–343
Theatres (<500 seats) including seating and stage equipment	2,900–3,300	269–307
Concert halls including seating and stage equipment	2,000–2,300	185–214
Sports halls including changing and social facilities	1,550–1,850	144–172
Swimming pools (international standard complete with changing facilities, grandstand, pool terrace excluding special equipment)	each	2,750,000
National museums including full air-conditioned and standby generator	2,000–2,500	186–232
City centre/central libraries	1,350–1,600	125–149
Branch/local libraries	1,150–1,350	107–125

Continued

	Cost m² B$	*Cost ft² B$*
Residential buildings		
Social/economic single family housing (multiple units)	550–650	51–60
Private/mass market single family housing two-storey detached/semi-detached (multiple units)	600–750	56–70
Purpose designed single family housing two-storey detached (single unit)	800–1,000	74–93
Social/economic apartment housing, low rise (no lifts)	750–900	70–84
Social/economic apartment housing, high rise (with lifts)	800–1,100	74–102
Private sector apartment building (standard specification)	930–1,030	86–96
Private sector apartment buildings (luxury)	1,100–1,400	102–130
Student/nurses halls of residence	700–900	65–84
Hotel, 5 star, city centre	2,200–2,700	204–250
Hotel, 3 star, city/provincial	1,600–2,100	149–195
Motel	750–1,200	70–111

EXCHANGE RATES

Figure 3.1 plots the movement of the Brunei dollar against the sterling, the euro, the US dollar and 100 Japanese yen since 2003. The values used in the figure are average of each year. The average exchange rate in the fourth quarter of 2013 was B$1.99 to the pound sterling, B$1.67 to the euro, B$1.24 to US dollar and B$1.24 to 100 Japanese yen.

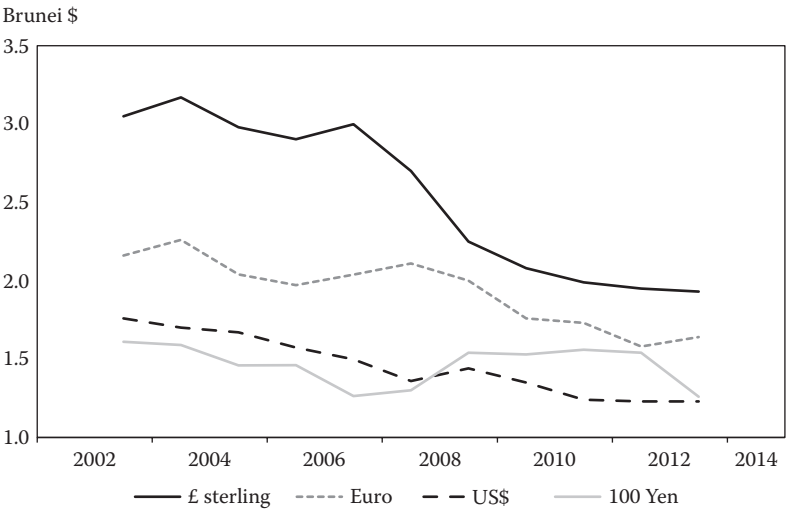

Figure 3.1 The Brunei dollar against sterling, euro, US dollar and 100 Japanese yen.

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Chapter 4

Cambodia

All data relate to 2013 unless otherwise indicated.

Population	
Population	15.41 mn
Urban population	20.19%
Population under 15	31.23%
Population 65 and over	5.25%
Average annual growth rate	1.5%
Geography	
Land area	181,035 km^2
Agricultural area (2011)	32.04%
Capital city	Phnom Penh
Population of capital city	1,501,725
Economy	
Monetary unit	Riels
Exchange rate (average fourth quarter 2013) to:	
The pound sterling	Riels 6,624
The US dollar	Riels 4,092
The euro	Riels 5,569
The yen × 100	Riels 4,080
Average annual inflation	2.9%
Inflation rate	3.0%
Gross domestic product (GDP) (2012)	Riels 56,616.8 bn
GDP per capita	Riels 4,062,231
Average annual real change in (GDP)	7.01%
Private consumption as a proportion of GDP (World Bank forecast on 2014)	79.3%
Public consumption as a proportion of GDP (World Bank forecast on 2014)	5.8%
Investment as a proportion of GDP	23.5%

Continued

Construction	
Gross value of construction output	N/A
Net value of construction output (2012)	Riels 3,662.5 bn
Net value of construction output as a proportion of GDP (2012)	6.5%

THE CONSTRUCTION INDUSTRY

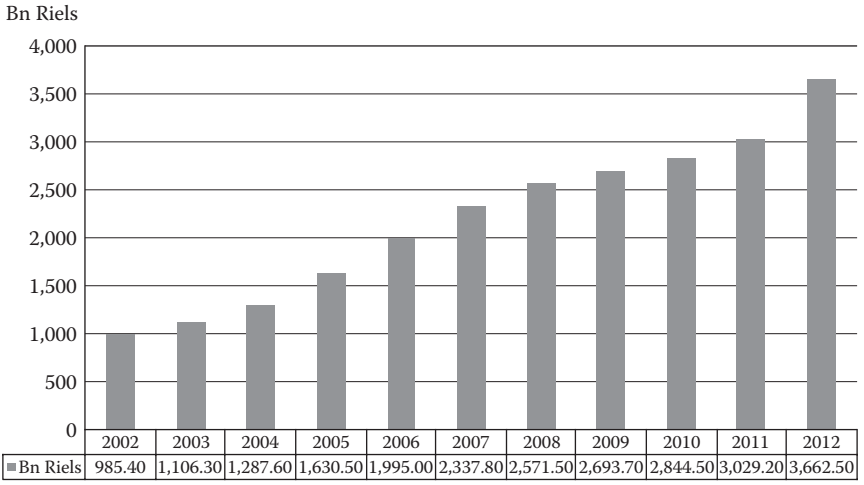
Construction output

The net output of construction industry in 2012 was Riels 3,662.5 billion, equivalent to approximately US$895 million, or 6.5% of GDP. The construction industry has expanded rapidly since 2007 and the growth for 2012 was 21%.

Construction is one of the four pillars supporting Cambodian economy. After the sluggish point in 2008 and 2009 from the global recession, there has been green signal of increase number of investors to register their investment and the construction activities started to rebound with positive rate. According to statistics from the Ministry of the Land Management, Urban Planning and Construction, total construction investments in 2012 was 71% higher compared to year 2011.

In the first quarter of 2013, according to the Ministry of Land Management, Urban Planning and Construction, the investment in the construction sector continued to grow by about 123% compared to the same period in the year 2012.

Figure 4.1 shows the net value of construction output from 2002 to 2012.



	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Bn Riels	985.40	1,106.30	1,287.60	1,630.50	1,995.00	2,337.80	2,571.50	2,693.70	2,844.50	3,029.20	3,662.50

Figure 4.1 Construction output at market price. (From Asian Development Bank (ADB) – Key indicators 2012.)

There were 1,694 construction projects with total capital of $2.1 billion in 2012, as compared to 2,125 projects with capital of $1.2 billion in 2011, and 2,149 projects with capital of $0.84 billion in 2010. Interestingly, whilst the number of construction projects has reduced from 2,125 projects in 2011 to 1,694 projects in 2012, total capital value, on the other hand, has increased. This is likely due to the fact of increase in the number of luxury/high-end projects in the market.

Characteristics and structure of the industry

The construction industry in Cambodia has expanded rapidly moving from the predominantly infrastructure and factories projects in 2001 to commercial and residential developments due to population growth and urbanisation, as well as relaxation/changes in legal system which allows foreigners to own condominiums and apartments on the upper floors of buildings.

Owing to the lack of large construction firms with capability to undertake large projects, construction management method is the most commonly used form of managing construction whereby the owner employs his own management team to manage the sub-contractors and suppliers. It is noticed that to-date, there are 571 construction companies registered with the Ministry with valid registration, all of these companies are also actively cooperating with domestic and foreign investors in the industry.

The construction industry in Cambodia depends heavily on imported materials mainly from China, Vietnam, Thailand and other Asian countries. The import of construction materials has increased slightly due to the recent rebound of construction activities after the global economic downturn in 2008 and 2009. According to data from the Ministry of Commerce, the import of construction material surged up in 2011 (US$560 million, an increase of 128% compared to 2010) and 2012 (US$655 million, an increase of 16% compared to 2011).

The total labour workforce has more than 8.8 million (61% of population) in 2011 and median age is 23 years, mostly in agriculture. With limited amount of vocational training available, the current supply of skilled workers is unable to meet the increased demand in the growing construction sector. Shortage of skilled workers is still a major concern in Cambodia. As a result, workers' wages are expected to increase at a faster rate due to the current lack of supply. Inevitable, this will potentially lead to an increase in construction costs.

Clients and finance

International assistance including Asian Development Bank (ADB), GMS Cross-Border Transportation Agreement World Bank and International

Monetary Fund (IMF), remains the main source of finance for Government infrastructure projects. Most of the large infrastructure projects are handled by investors from China, Japanese and South Korea who have been investing heavily in Cambodia. Private investments have also increased substantially in the last few years, mainly in the residential and commercial projects.

Selection of design consultants

There are no specific procedures and criteria for the selection of design consultants in the private sector. Private developers normally select their design consultants based on their experience and their fees. For public investment projects funded by the World Bank, ADB, JICA, the selection of design consultants generally follow its own procedures.

Contractual arrangements

There is no standard Form of Contract in Cambodia. Various Forms of Contract are used in private sector. The most commonly adopted Form of Contract is the FIDIC Short Form Contract, whilst the most common form of contract management is Construction Management whereby either the Owner employs a consultant or set up his own site team to manage the subcontractors and the suppliers.

Development control and standards

All construction works must be applied for construction permit except of small habitations located in the rural areas or far away from the National roads, railroads, tourism's resorts, national patrimony and protected areas, regardless of its size or construction materials, places of cult, maintenance and repair works without structural modification and public accommodation.

For industrial and commercial building of less than 3,000 square metres, the permit is issued by the Governor of the municipality or the province. For industrial and commercial building (public and private facilities) of more than 3,000 square metres, the permit is issued by the Ministry of Land Management, Urbanization and Construction. The permit for construction of defence works or military buildings, national heritage is also issued by Ministry of Land Management, Urbanization and Construction. The period for issuance of construction permit is 45 days from the date of application. Construction works must commence within one year from the issuance of the permit. Upon completion, the building must be approved by the Ministry.

The Cambodia building codes have not been established. Hence, most companies will table reference from other international building codes as reference.

CONSTRUCTION COST DATA

Cost of labour

The figures that follow are typical of labour costs in the Phnom Penh area as at the fourth quarter of 2013.

	Wage rate (per day) US$	*Number of hours worked per year*
Site operatives		
Bricklayer	8.00–9.00	2,496
Carpenter	10.00–12.00	2,496
Plumber	8.00–10.00	2,496
Electrician	10.00–12.00	2,496
Structural steel erector	7.50–9.00	2,496
Welder	7.00–9.00	2,496
Labourer	5.00–5.50	2,496
Equipment operator (Tower Crane)	10.00–12.00	2,496
Site supervision	*(per month)*	
General foreman	250	2,496
Trades foreman	250	2,496
Clerks of works	200	2,496
Resident engineer	800	2,496
Contractors' personnel		
Site manager	1,300	2,496
Site engineer	700	2,496
Site quantity surveyor	700	2,496
Consultants' personnel		
Senior architect	1,200	2,496
Senior engineer	1,200	2,496
Senior surveyor	1,200	2,496

Cost of materials

The figures that follow are the costs of main construction materials, delivered to site in the Phnom Penh area, as incurred by contractors in the fourth quarter of 2013. These assume that the materials would be in quantities as required for a medium-sized construction project and that the location of the works would be neither constrained nor remote. All the costs in this section exclude value-added tax (VAT).

	Unit	*Cost US$*
Cement and aggregate		
Ordinary Portland cement in 50 kg bags	tonne	107.00
Coarse aggregates for concrete	m^3	16.00
Fine aggregates for concrete	m^3	19.00
Ready mixed concrete (mix Grade 20)	m^3	66.00
Ready mixed concrete (mix Grade 35)	m^3	75.00
Steel		
Mild steel reinforcement	tonne	715.00
High tensile steel reinforcement	tonne	740.00
Bricks and blocks		
Common bricks (180 × 80 × 80 mm)	1,000	330.00
Common bricks (180 × 40 × 40 mm)	1,000	310.00
Timber and insulation		
Softwood for carpentry	m^3	300.00–500.00
Softwood for joinery	m^3	500.00–600.00
Hardwood for joinery	m^3	600.00–800.00
Exterior quality plywood (20 mm)	m^2	10.50
Plywood for interior joinery (4 mm)	m^2	1.70
Plywood for interior joinery (20 mm)	m^2	8.00
Chipboard sheet flooring (25 mm)	m^2	20.00
Glass and ceramics		
Float glass (6 mm)	m^2	10.00–20.00
Plaster and paint		
Good quality ceramic wall tiles (200 × 200 mm)	m^2	8.00–12.00
Plaster in 50 kg bags	tonne	80.00–90.00
Tiles and paviors		
Coloured clay roof tiles (280 × 390 mm)	m^2	4.00–11.00
Drainage		
WC suite complete (medium quality)	each	700.00–800.00
Lavatory basin complete (medium quality)	each	200.00–300.00
100 mm diameter PVC drain pipes	m	2.50
150 mm diameter cast iron drain pipes	m	32.50

Unit rates

The descriptions that follow are generally shortened versions of standard descriptions listed in full in Chapter 19. Where an item has a two-digit reference number (e.g. 05 or 33), this relates to the full description against that number in Chapter 19. Where an item has an alphabetic suffix (e.g. 12A or

34B) this indicates that the standard description has been modified. Where a modification is major the complete modified description is included here and the standard description should be ignored; where a modification is minor (e.g. the insertion of a named hardwood) the shortened description has been modified here but, in general, the full description in Chapter 19 prevails.

The unit rates that follow are for main work items on a typical construction project in the Phnom Penh area in the fourth quarter of 2013. The rates include all necessary labour, materials and equipment. Allowance of 15% to cover preliminaries and general items and 8% to cover for contractor's profit and overheads have been included in the unit rates. All the rates in this section exclude VAT.

		Unit	*Rate US$*
Excavation			
01A	Mechanical excavation of foundation trenches including earthwork support	m^3	3.00
02	Hardcore filling making up levels	m^3	2.50
Concrete work			
04	Plain *in situ* concrete in strip foundations in trenches	m^3	65.00
05	Reinforced *in situ* concrete in beds	m^3	85.00
06	Reinforced *in situ* concrete in walls	m^3	85.00
07	Reinforced *in situ* concrete in suspended floors or roof slabs	m^3	85.00
08	Reinforced *in situ* concrete in columns	m^3	85.00
09	Reinforced *in situ* concrete in isolated beams	m^3	85.00
10	Precast concrete slabs	m^2	65.00
Formwork			
11	Softwood formwork to concrete walls	m^2	15.00
12	Softwood formwork to concrete columns	m^2	15.00
13	Softwood formwork to horizontal soffits of slabs	m^2	15.00
Reinforcement			
14	Reinforcement in concrete walls	tonne	670.00
15	Reinforcement in suspended concrete slabs	tonne	670.00
16	Fabric reinforcement in concrete beds	m^2	N/A
Steelwork			
17	Fabricate, supply and erect steel framed structure	tonne	1,300.00
18	Framed structural steelwork in universal joist sections	tonne	1,300.00
19	Structural steelwork lattice roof trusses	tonne	1,300.00

Continued

		Unit	*Rate US$*
Brickwork and blockwork			
21A	Solid (perforated) concrete blocks (70 mm thick)	m^2	20.00
23A	Local one brick wall	m^2	6.00
Roofing			
24A	Concrete interlocking roof tiles 400 × 330 mm	m^2	9.00
25A	Plain clay roof tiles 255 × 140 mm	m^2	11.00
27	Sawn softwood roof boarding	m^2	1.20
Woodwork and metalwork			
34	Preservative-treated sawn softwood 50 × 100 mm	m	7.50
35	Preservative-treated sawn softwood 50 × 150 mm	m	10.80
37	Two panel glazed door in hardwood, size 850 × 2000 mm	each	260.00
41	Hardwood skirtings	m	10.00
Plumbing			
43A	PVC rainwater pipes (100 mm diameter) class 8.5	m	2.50
Electrical work			
52	PVC insulated and copper-sheathed cable	m	0.50
53A	10 amp unswitched socket outlet	each	6.00
54	Flush mounted 20 amp, 1 way light switch	each	6.00
Finishings			
55	2 coats gypsum-based plaster on brick walls	m^2	4.30
56	White glazed tiles on plaster walls	m^2	23.00
58	Cement and sand screed to concrete floors	m^2	3.50
Painting			
62	Emulsion on plaster walls	m^2	3.80
63	Oil paint on timber	m^2	4.80

Approximate estimating

The building costs per unit area that follow are averages incurred by building clients for typical buildings in the Phnom Penh area as at the fourth quarter of 2013. They are based upon the total floor area of all storeys, measured between external walls and without deduction for internal walls.

Approximate estimating costs generally include mechanical and electrical installations but exclude furniture, loose or special equipment and external works; they also exclude fees for professional services. The costs shown are for specifications and standards appropriate to Cambodia and this should be borne in mind when attempting comparisons with similarly described building types in other countries. A discussion of this issue is included in Chapter 2. Comparative data for countries covered in this publication, including construction cost data, are presented in Part III.

Approximate estimating costs must be treated with caution; they cannot provide more than a rough guide to the probable cost of building. All the rates in this section exclude VAT.

	Cost m^2 *US$*	*Cost* ft^2 *US$*
Industrial buildings		
Light-duty flatted factories, 150 lb loading	290	27
Single-storey conventional factory of structural steel work	435	40
Administrative and commercial buildings		
Average standard offices, high rise	575	53
Prestige offices, high rise	675	63
Residential buildings		
Detached houses and bungalows	385	36
Average standard apartments, high rise	480	45
Luxury apartments, high rise	770	72
3-star budget hotel inclusive of fixtures and fittings	1,055	98
5-star luxury hotels inclusive of fixtures and fittings	1,440	134
Others		
Car parks, above ground	335	31
Retail/department stores (without finishes)	670	62

Value-added tax

The standard rate of VAT is currently 10%.

EXCHANGE RATES

Figure 4.2 plots the movement of the Riels against the sterling, the euro, the US dollar and 100 Japanese yen since 2003. The values used in the figure are quarterly and the method of calculating these is described and general guidance on the interpretation of the figure are provided in Chapter 2. The average exchange rate at the fourth quarter of 2013 was Riels 6,624 to pound sterling, Riels 5,569 to euro, Riels 4,092 to US dollar and Riels 4,080 to 100 Japanese yen.

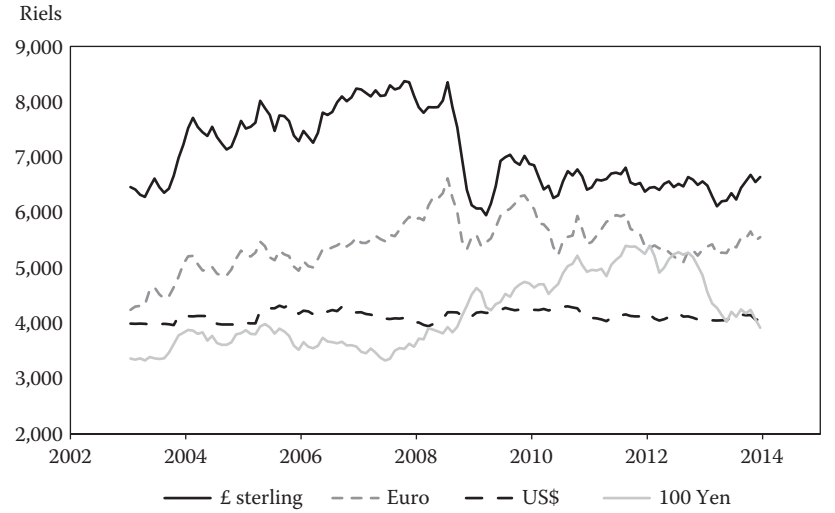


Figure 4.2 The riels against sterling, euro, US dollar and 100 Japanese yen.

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Chapter 5

China

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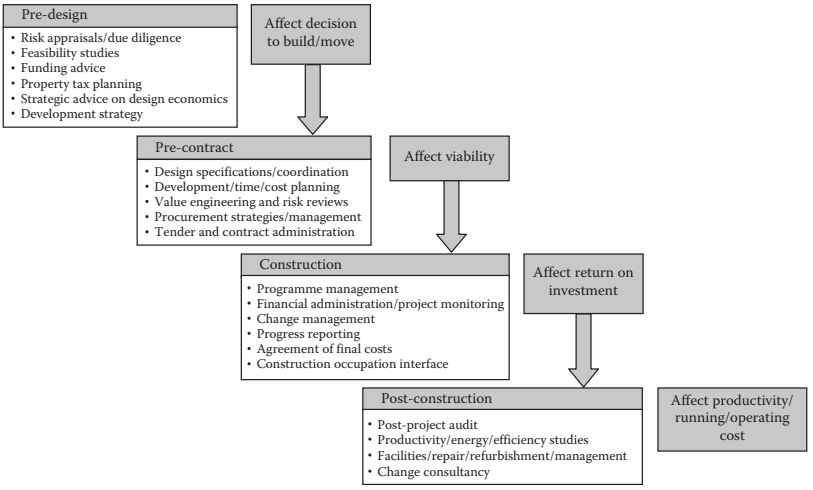
TYPICAL PROJECT STAGES, INTEGRATED SERVICES AND THEIR EFFECT



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All data relate to 2013 unless otherwise indicated.

Population	
Population	1,361 mn
Urban population	53.7%
Population under 15	17.5%
Population 65 and over	9.7%
Average annual growth rate (2008–2013)	0.49%
Geography	
Land area	9,600,000 km^2
Agricultural area	46.3%
Capital city	Beijing
Population of capital city (2012)	20.7 mn
Economy	
Monetary unit	Renminbi (Rmb)
Exchange rate (average fourth quarter 2013) to:	
The pound sterling	Rmb 9.97
The US dollar	Rmb 6.12
The euro	Rmb 8.40
The yen ×100	Rmb 6.00
Average annual inflation (2008–2013)	3.2%
Inflation rate	2.6%
Gross domestic product (GDP)	Rmb 56,885 bn
GDP per capita	Rmb 41,796
Average annual real change in GDP (2008–2013)	9.0%
Consumption as a proportion of GDP	50.0%
Net exports of goods and services	–4.4%
Investment as a proportion of GDP	54.4%
Construction	
Gross value of construction output	Rmb 15,931 bn
Net value of construction output	Rmb 3,900 bn
Net value of construction output as a proportion of GDP	6.9%

THE CONSTRUCTION INDUSTRY

Construction output

The property market in China was at an unprecedented peak in 2007. The hot property market led to a boom in construction activities. The boom was due to the implementation of the Western Development Strategy by the Central Government, foreign investments and also the extensive

developments from the newly established local private companies. The 2008 financial tsunami slowed the growth for one year. The continual investment in the infrastructure by the Government, the large-scale rebuilding projects in Sichuan after the 12 May 2008 earthquake and the spreading of private developments into the second-tier cities and inland provinces due to insatiable demand for new modern homes and good commercial spaces, sustained a robust growth from 2009 to 2012. The net value of construction output in 2012 was Rmb 3,546 billion, equivalent to US$578 billion, representing 6.8% of the GDP. In line with the remarkable growth of China's economy in recent years, the construction industry in China is now one of the largest in the world.

Many political observers have pointed out that a large proportion of senior ministers in the Chinese Government have an engineering education. This is in contrast to that in western developed countries where political leaders tend to come from a legal or social science background. It is therefore not surprising that the Chinese Government has always had a particular interest for infrastructure developments. Such policies are usually focused on by many leaders in China. An example is how Past Premier Li Peng pushed forward the Three Gorges Dam project in the face of fierce criticism from both outside and inside the country and the enormous resettlement problem of whole towns and villages affected. China's new infrastructure is the envy of many developing countries. Many articles have been written comparing China with another major rising economy. India and China's infrastructure is always being quoted as one of the country's main advantages. However, the breakdown in electricity supply and railway service in the central and southern parts of China at the beginning of 2008 due to a series of unusually harsh snow storms has put into question its sufficiency for modern China. It appears that investment in infrastructure works will not be reduced for quite some time. In fact, the net value of construction output in 2012 was 2.5 times of that in 2007.

On the building side, the passing of the long awaited Property Rights Law in 2007 (the law was first initiated in 1994 and has gone through 8 readings since then) aroused the long suppressed Chinese Dream of owning one's own house. The rush to buy newly constructed homes has made property development so hot and property prices rising so fast that the Government has had to implement a series of administrative measures to control its activities. Due to the strong demand, particularly in the big provincial capital cities, the price of residential properties has been almost doubled between the period 2008 and 2012. The Government's administrative measures have not been successful in controlling the property development activities.

On another aspect, international environmental pressure groups have been raising concerns over the effects on the environment due to China's massive building activities. To address such criticisms, the Government has

promised to boost its efforts in tackling with environmental problems by the introduction of a new Energy Law which will call for the development of energy-efficient production processes, energy-efficient consumption approaches and sustainable development for new construction projects. The new Energy Law would increase the cost of construction but the effect on demand for building works would be very minimal. On the other hand, it is expected that it will elevate the design and construction capability of design institutes and construction companies and will generate new types of industries and projects, like wind farms and biomass plants and so forth for the construction industry.

China's construction industry has been growing at an average annual rate of nearly 19% from 1997 to 2007. From 2007 to 2012, the average annual growth rate was 11%. The distribution of construction activities in China in 2012 is shown in Table 5.1.

Construction work is classified according to the following categories:

1. Building works including building and housing
2. Civil engineering works, including highways, bridges, dams, harbours, power stations, airports and so forth
3. Equipment installation
4. Decoration and fitting out works
5. Other construction works

The gross construction output for the various categories in 2012 is shown in Table 5.2.

Characteristics and structure of the industry

The Chinese have always been masters in construction. From the Great Wall of China in the distant past to the modern Yangtze River Bridge built during the early days of modern China, the Chinese have shown their expertise in complicated building technology. Even during the Cultural Revolution days, China exported construction to African and East European countries, undertaking construction projects for their comrades in need. Lu Ban (507–444 BC), a legendary carpenter who lived in the Warring States Period is honoured by builders all over China, including Hong Kong. It is, therefore, not surprising that the contractors in China have taken only 20 years to chase up with foreign contractors. Nowadays, Chinese contractors are performing as well as any international contractor in the structure and building works. A slight lag might still exist in the building services installations and high standard decoration works. However, the gap is closing fast. Over 90% of the works in famous iconic developments such as the CCTV Building, the Olympic Main Stadium and the National Opera House were constructed by the Chinese contractors.

Table 5.1 Regional distribution of construction output compared to population, 2012

Region	*% of population*	*% of construction output*	*Rank by population*	*Rank by construction output*
Beijing	1.5	4.8	26	6
Tianjin	1.0	2.4	27	17
Hebei	5.4	3.5	6	10
Shanxi	2.7	1.9	18	19
Inner Mongolia	1.8	1.1	23	25
Liaoning	3.2	5.5	14	3
Jilin	2.0	1.5	21	22
Heilongjiang	2.8	1.7	15	21
Shanghai	1.8	3.5	24	11
Jiangsu	5.8	13.4	5	1
Zhejiang	4.0	12.6	10	2
Anhui	4.4	3.1	8	14
Fujian	2.8	3.2	17	12
Jiangxi	3.3	2.0	13	18
Shandong	7.2	5.3	2	4
Henan	6.9	4.4	3	9
Hubei	4.3	5.1	9	5
Hunan	4.9	3.2	7	13
Guangdong	7.8	4.7	1	7
Guangxi	3.5	1.4	11	23
Hainan	0.7	0.2	28	30
Chongqing	2.2	2.9	20	15
Sichuan	6.0	4.5	4	8
Guizhou	2.6	0.8	19	27
Yunnan	3.4	1.7	12	20
Tibet	0.2	0.1	31	31
Shanxi	2.8	2.6	16	16
Gansu	1.9	1.0	22	26
Qinghai	0.4	0.2	30	29
Ningxia	0.5	0.3	29	28
Xinjiang	1.6	1.2	25	24

Source: China Statistical Yearbook, 2013.

Note: Due to sampling and survey errors, the total of region populations are not necessarily equal to 100%.

Table 5.2 Gross construction output of construction enterprises in categories in 2012

Type of work	*Rmb 1,000,000*
Building works	8,713,384
Civil engineering works	3,478,408
Equipment installation (equipment supplied by others)	806,277
Decoration and fitting out works	531,019
Other construction works	192,699
Total	13,721,786

Source: China Statistical Yearbook, 2013.

The Ministry of Construction (MOC) supervises and regulates all construction activities in China. Its administration covers town planning, surveying, designing, tendering, construction, quality inspection and material standards, etc. Its control in certain parts of the industry is so detailed and specific that many international developers would find it hard to understand.

China adopts a main contractor approach. The main contractor is made responsible for all matters happening on the construction site and the overall quality of the works, including work done by his subcontractors. Contractors are divided into different categories: Building, Highway, Railway, Port and Waterway, Hydraulic, Electricity, Mining, Refining, Chemical, Civil, Information System and Electrical & Mechanical. Building contractors are subdivided into four grades: Special Grade, Grade 1, Grade 2 and Grade 3. The permitted scope of works that can be undertaken by the various grades are as in Table 5.3.

Contractors in China tend to be very large and employ a high percentage of direct labour. Specialist works are subcontracted (with the permission of the developer) to qualified subcontractors. The number of levels of subcontracting is relatively covered when compared to the markets in Hong Kong or other countries. Most contractors are state-owned enterprises (SOEs) or branches of SOEs. They are enormous conglomerates but many are burdened by the welfare and retirement responsibility for their workers. Some SOEs are mini societies with their own schools and even hospitals. To be

Table 5.3 Permitted scopes of work by different grades of building main contractors

Special Grade	*Grade 1*	*Grade 2*	*Grade 3*
Unlimited	Maximum 240 m height	Maximum 120 m height	Maximum 70 m height
	Maximum 40 storeys	Maximum 28 storeys	Maximum 14 storeys
	Maximum 200,000 m^2 floor area	Maximum 120,000 m^2 floor area	Maximum 60,000 m^2 floor area

more competitive, the SOEs establish subsidiary companies to make them leaner to compete in the market. For example, the First Construction Unit of China State Construction has Engineering Bureaus 1–8 as main contractors in the local construction industry. These subsidiary companies compete against each other for business and even against the parent company, China State Construction Company, for work.

Apart from working locally and on a national scale, many Chinese contractors are increasingly getting involved in international contracts mostly in the field of civil engineering works in developing countries. The table below shows the major building contractors in China as ranked in the *Engineering News Record's Top 250 International Contractors* (Table 5.4).

Foreign contractors working in China used to operate under a project branch registration which was approved on a project-by-project basis under the *Interim Measures for the Administration of Qualifications of Foreign Enterprises Contracting Projects in China ('Decree 32')*. Since 2003, following the issue of the *Regulation on Management of Foreign-Invested Construction Enterprises ('Decree 113')*, this arrangement has been abolished and any foreign contractor who wishes to enter China's construction industry must either joint venture with a qualified Chinese contractor or obtain a qualification certificate from the MOC. The threshold for becoming a special grade contractor (the only grade worth being for many international contractors) is the same as that for local companies but it would be very difficult for foreign companies to meet as the MOC recognises only their investment and track record in China. In 2012, there were 187 special grade building main contractors with only one being a foreign invested

Table 5.4 Top 10 Chinese contractors ranked by revenue from projects outside home country, 2012–2013

	ENR rank by revenue	
Major contractors	*2012*	*2013*
China Communications Construction Group	10	10
Sinohydro Corporation	23	20
China State Construction Engineering Corporation	22	24
China National Machinery Industrial Corporation	24	25
China Railway Group Ltd.	39	34
CITIC Construction	46	43
China Metallurgical Group Corporation	42	51
China Railway Construction Corp. Ltd.	30	53
SEPCOIII Electric Power Construction Corp.	53	54
China Gezhouba Group Co. Ltd.	62	56

Source: Engineering News Record Top 250 International Contractors, 2012 and 2013.

enterprise. Most foreign contractors, therefore, work under construction joint ventures with local construction companies.

Competitive tendering has become the accepted practice for selection of contractors including government projects. It should be noted, however, that tendering in China is very different from that in other countries. All tenders, even for privately funded developments, are subject to the *Tender Law of the People's Republic of China*. The Law is intended to regulate tendering and bidding activities, maintain and improve fair and positive competition, enhance efficiency in resource allocation and prevent corruption in the tendering process. However, the rigid procedures stipulated by the Law basically deprive decision making by the clients themselves and is therefore highly unpopular with private developers. The tendering process is handled by a qualified tendering agent who prepares the documents and sets the evaluation criteria in consultation with the client. The tender award is later made upon recommendation by an evaluation committee that consists of at least five members of which two-thirds must be 'specialists' who are randomly selected from a list of names approved by the local Construction Committee. The process is more appropriate for public-funded projects and might initially has been intended for such projects. However, later interpretation of the term 'projects of public interest and public safety' as stated in Article 3 of the Law has extended it to cover virtually all types of building developments. Tendering agency is a relatively new business. Firms are categorised into Grade A, B and C by the MOC, with Grade A being the highest and unlimited in the project size it can handle. In 2012, there are a total of approximately 5,500 tendering agents in China, around 20% of them are Grade A.

The land system

There is no freehold land in China. Under the *1982 Constitution of the People's Republic of China*, all land is owned either by the State or by Agricultural Collectives. Basically, land in the cities is owned by the State and land in the rural and suburban areas are owned by collectives. Despite such arrangement, all land is actually controlled by the State as the State has absolute discretion to requisite land from the Agricultural Collectives for public purposes, subject to payment of compensation and settlement fees. The *Land Administration Law* and its *Implementing Regulations* stipulate that only state-owned land can be leased for commercial development purposes and, therefore, collective owned land may only be used for property developments after it is converted into state-owned land through the stipulated land-acquisition procedures.

State-owned land-use rights can be obtained by entering into a land grant contract with the Government and by paying a land grant premium. To increase Government transparency and ensure fair trade, the Ministry of

Land and Resources issued the *Rule of Granting of State-owned Land by Bidding, Auction or Quotation* in 2002, requiring granting of land leases for commercial purposes must be done through land auctions or bidding at the State or provincial Land Exchanges. The land so leased can be developed, mortgaged or transferred.

The term of the leases varies according to the specified usage for the land and is normally as follows:

Land lease for industry purpose	:	50 years
Land lease for hotel, commercial and entertainment purpose	:	40 years
Land lease for science, technology, education, cultural and health purpose	:	50 years
Land lease for residential purpose	:	70 years

The *Rule of Granting of State-owned Land by the Agreement* issued in 2003 allows application for conversion of land-use purpose (e.g. from industrial to commercial) for the land which is acquired by an agreement. The approval will be subjected to compliance with town planning rules and the payment of a conversion premium for the value thus added. The success of such applications is uncertain and can be quite time consuming but conversion premiums would normally charged lower than the land prices demanded at auctions or tenders.

Speculative buying and selling of land are not encouraged. Normally, land, leased through auctions or tenders, have to be developed within 4 years. Land not developed within this period face the imposing of penalties and, in extreme cases, confiscation.

Clients and finance

Owing to its closely controlled economy and not freely convertible renminbi, China was not affected much by the Asian Financial Crisis in 1998. Whilst other countries in Asia struggled to recover, China's economy started its strong growth and has been growing at an average rate of 11.5% in GDP from 1998 to 2008. The growth speed has slowed down since 2008 and the average rate in GDP growth from 2008 to 2012 was 9.3%. As mentioned above, the Central Government's implementation of the Western Development Strategy boosted infrastructure investment and channelled private investment from the coastal cities to the inland provinces. The State Planning Commission (SPC) is responsible for preparing long-term investment plans and approves all the major projects initiated by the various Ministries and Municipal Governments. In general, however, decision-making and policy have become less centralised and the Municipal Governments are acting with increasing autonomy. This has made the initiation and implementation of new projects much faster than before.

The restructuring of the banking system in China in preparation for the opening of its finance market under the terms of the World Trade Organisation (WTO) Agreement has increased the availability of credit to both the business sector and ordinary individuals. Property mortgages, which used to be scarce previously, are now a major business for all Chinese banks. This has directly fuelled the increase in property prices. The emerging stock market has also provided an alternative cheap source of funds for many companies.

Apart from spending by Government and local developers, the property market also attracted a lot of interest from overseas investors. All major Hong Kong property conglomerates increased their investment in China at unprecedented rates. A large number of private equity funds have also been very active in China, snatching up anything that is feasible in the market. Most of these funds participate as joint venture partners with the original local developers, providing them with the necessary finance to complete the project.

Investors interested in property development must comply with the *Administrative Regulations of the People's Republic of China on Urban Real Estate Development and Operation*, effective from 1998, which stipulates that only qualified Real Estate Development Enterprises (RDEs) are eligible to conduct real estate development and operation. An RDE can be a permanent enterprise or a Special Purpose Vehicle (SPV) established for the development of a particular project and will cease to exist at the completion of the project. RDEs will need a real estate qualification which is divided into four grades: Grade 1, 2, 3 and 4.

The Central Government has been very concerned on the runaway prices of properties and the increasing gap between the haves and have nots. To build a harmonious society, the Government has been encouraging development of cheaper and smaller residential units that are more affordable by the masses. In 2006, a mandatory requirement was issued that all large housing developments must have 70% of its units of 90 m^2 gross floor area or below. On the other hand, since 2009, the Government began building public housing for low-income families. Seeing opportunity in this trend, some companies with construction background have entered the low-cost housing market. The returns are not high as the sale prices are dictated by the Government who, on the other hand, virtually guarantees purchase of the units built.

Selection of consultants

The designs of all construction works must be submitted for approval by a qualified Local Design Institute (LDI). These are multi-disciplinary organisations, often with several thousand staff strength, which provide the designs for local projects. Most of these institutes seek work independently

whilst others are attached to various Ministries, large enterprises or local government.

Official fee scales exist but competitive fee-bidding is also becoming an accepted practice now. Typically, fees will be in the region of 2.5% of the construction cost.

Any foreign architect or engineer working on a project in China must work with an LDI because only the latter is authorised to submit drawings to the local authority for approval. In addition, the foreign architect or engineer would also need the LDI to advise them on the Chinese planning and building codes and what technology and materials are locally available. The most common arrangement would be to employ a foreign architect and engineer to carry out the schematic design and the preliminary design for the project. The LDI may be employed by the architect/engineer or employed directly by the client to advise on the planning and building codes and make the necessary submissions. The LDI will then take over the design and produce construction drawings for the contractor to execute his works. Construction drawings in China are more detailed than those in Hong Kong or many other countries.

LDIs are allocated to one of the four classifications, namely:

- Comprehensive Class, of which they are qualified to carry out design works for all 21 specified construction sectors, including building construction.
- Designated Sector Class, of which they are only qualified to carry out design works for designated construction sector(s), for example, building construction.
- Designated Sub-Sector Class, of which they are only qualified to carry out design works for designated sub-sector(s), for example civil defence works under building construction sector.
- Specialist Class, of which they are only qualified to carry out design works for specialised works under corresponding sectors, for example, fitting out works, curtain wall and so forth.

Each institute will be further graded according to the type and size of the projects that they are qualified to handle. Table 5.5 shows the grading for the building construction sector.

The classification accords to the number of qualified staff employed by the institute, their experience and other related criteria. In 2013, there are approximately 1,900 Class A LDIs.

LDIs do not normally carry out supervision duties of the construction works. Under the communist system, LDIs and contractors are on the same standing and they virtually split the work required of a construction project: the LDI does the design and the contractor does the construction. This arrangement had worked fine when all projects were publicly funded

Table 5.5 Projects permitted for various grades of design institutes in building construction sector

Public buildings	*Residential buildings*	*Industrial buildings and warehouses*	*Other*
Class A			
All types	All types	All types	All types
Class B			
Building not exceeding 20,000 m^2 in size	Estate not exceeding 300,000 m^2 in size	Warehouse and factory of all sizes	Fitting out works for 3-star hotel and standards below
Building height not exceeding 50 m	Building not exceeding 20 storeys	Building height not exceeding 50 m	Building height not exceeding 50 m
		Single-storey building with maximum span less than 30 m and working load of hoisting beam not exceeding 30 tons	
		6-storey building with maximum span less than 12 m	
Class C			
Building not exceeding 5,000 m^2 in size		Small-sized warehouse and simple-equipped factory	Fitting out works for 1-star hotel and standards below
Building height not exceeding 24 m	Building not exceeding 12 storeys	Building height not exceeding 24 m	Building height not exceeding 24 m
		Single-storey building with maximum span less than 24 m and working load of hoisting beam not exceeding 10 tons	
		3-storey building with maximum span less than 6 m and no live load at roof top	
Class D			
Building not exceeding 2,000 m^2 in size	Not exceeding 2,000 m^2 per block		Standard chimney not exceeding 20 m high

(*Continued*)

Table 5.5 (Continued) Projects permitted for various grades of design institutes in building construction sector

Public buildings	*Residential buildings*	*Industrial buildings and warehouses*	*Other*
	Reinforced concrete and blockwork structure		Water tank, with capacity not exceeding 50 m^3
Building height not exceeding 12 m	Not exceeding 4-storey high	Single-storey building with maximum span of 15 m and working load of hoisting beam not exceeding 5 tons	Water pool, with capacity not exceeding 300 m^3
		or	
		2-storey building with maximum span of 7.5 m and no live load at roof top	Material storage tank, with diameter not exceeding 6 m

and everybody was working for the State. When the market opened in the 1980s, the MOC realised the lack of supervision on the contractor's works. This gave rise to the construction supervisors' profession. The MOC stipulates that all new construction works and all major alteration works must be supervised by a qualified construction supervising firm who should be entrusted with the role of supervising the contractor and inspection of the quality of the works performed. The construction supervisors report to the Quality Inspection Department of the MOC. Construction supervising firms are classified into three grades: Grade A, B and C respectively, with Grade A being the highest. In 2012, there are approximately 6,600 construction supervising firms in China, around 20% of them are Grade A.

Construction cost control can be carried out by the construction supervisors or by construction cost engineers. Construction cost engineers are the equivalent of quantity surveyors in the British system. The local cost engineering firms tend to be localised and carry out specific tasks for submission purposes under local regulations (e.g. a preliminary estimate, a bill of quantities or an assessment of the final account) although a few large ones have adopted the UK style of comprehensive approach. A number of international quantity surveying firms, mostly branches from their base in Hong Kong, are also active in the Chinese market. Hong Kong quantity surveying firms have been working in China since the early 1980s and it was them who introduced the competitive tendering and cost control concepts to China. All Hong Kong quantity surveying firms offer the full comprehensive service as they do in Hong Kong. Projects carried out by international quantity surveying firms include not only those by foreign investors but also projects by local developers and Semi-Government

corporations. International quantity surveying firms used to operate in China either in joint venture with local firms or under licences granted on a project-by-project basis. In 2007, the Government issued *The Provision for Administration of Foreign-Funded Engineering Service Enterprises ("Decree 155")*, allowing the establishment of wholly foreign-owned quantity surveying firms to practise in China provided they meet the same requirements stipulated for local firms. The employment of a quantity surveyor is not mandatory, but for many foreign investors, the employment of an international quantity surveyor would offer assurance on tendering and contractual arrangements which can be complex or even appear irregular.

Contractual arrangements

One of the most important laws relevant to the construction industry in China must be *The Construction Law* of the People's Republic of China which became effective from 1st March 1998. The Construction Law stipulates how construction activities should be carried out. It also specifically requires the employer and contractor of a construction project to enter into a written contract which clearly defines the rights and obligations of the two parties. However, the Form of Contract to be employed is not stated. There are two most popular local standard Forms of Contract. One is PRC *Standard Tender Document for Construction Works (2007)*, issued jointly by nine Ministries of PRC including National Development and Reform Commission, Ministry of Finance and Ministry of Housing and Urban–Rural Development and the like. This contract is for all kinds of construction including civil, infrastructure and building works. Another popular standard form is PRC *Standard Tender Document for Building and Utility Works (2012)*, issued by Ministry of Finance and Ministry of Housing and Urban–Rural Development. This latter form is a supplement to the former and is used for building and utility works only. Localised versions issued by the provincial construction departments are also available. These contracts should be used with care as the apportionment of risks and responsibilities between the client and the contractor differs quite widely with other popular standard forms such as the JCT, HKIA or FIDIC forms that originated from other countries. Of all the foreign standard forms introduced into China, the *Conditions of Contract for Work of Civil Engineering Construction* issued by the *Federation Internationale des Ingenieurs-Conseils* (FIDIC) has had the widest acceptance. The FIDIC also has an official Chinese translated version which gives it convenience of use as all contracts in China have to be translated into Chinese for registration purposes.

It should be noted that China has a business tax that is applicable to all transactions for services and works. A value-added tax (VAT) is applicable to sales of materials and equipment. The business tax for general services is

5% whilst that for construction works is around 3%. Contractors pay VAT for materials and equipment bought plus an additional construction business tax on the total payment received from the client. For certain specifically listed equipment purchased directly by the client, the contractor will only pay for the VAT. The contractual arrangements will have an impact on the total amount of tax payable and should therefore be carefully planned and arranged.

In the event of a contractual dispute, it is probable, depending on the provisions of the contract, that some form of arbitration or conciliation will be employed. Arbitration in China is governed by the *Arbitration Law of the People's Republic of China*. The China International Economic and Trade Arbitration Commission (CIETAC) is the main arbitration commission to hear disputes with a foreign element. However, if it is desired to hold the arbitration outside mainland China, popular choices include the Hong Kong International Arbitration Centre, Stockholm Chamber of Commerce and the Singapore International Arbitration Centre. Although arbitration is common in China, there is still a strong bias in favour of settling disputes without recourse to arbitration or litigation. Conciliation has long played a prominent role in Chinese society and culture and has always been actively employed on disputes arising from Chinese – Foreign business contracts.

Development control and standards

The master planning and elevation treatment of developments are controlled by the relevant planning commissions of the various cities and provinces. Detail design of the buildings must comply with the design codes and standards issued by the relevant Ministry Commission under the State Council. The followings are some commonly used codes and standards in building developments:

Code for design of building foundation	GB50007-2011
Load code for the design of building structures	GB50009-2012
Code for design of concrete structures	GB50010-2010
Code for seismic design of buildings	GB50011-2010
Code for design of building water supply and sewerage	GB50015-2003 (2009 edition)
Code for fire protection design of buildings	GB50016-2006
Code for design of steel structures	GB50017-2003
Code for design of heating, ventilation and air-conditioning	GB50019-2003
Standard for lighting design of buildings	GB50034-2004
Code for fire protection design of tall buildings	GB50045-95 (partly revised in 2005)

Continued

Code for design of electric power supply systems	GB50052-2009
Code for design of dwelling houses	GB50096-2011
Code for design of high-rise structures	GB50135-2006
Code for planning design of urban residential area	GB50180-93 (partly revised in 2002)
Code for fire prevention design of interior decoration of buildings	GB50222-95 (partly revised in 2001)
Standard for classification of urban land and for planning of constructional land	GBJ137-90
Standard for daylighting design of buildings	GB/T50033-2001
Standard for design of intelligent building	GB/T50314-2007

The *Construction Law of the People's Republic of China* also addresses the construction controls and construction quality. The Construction Law requires that, prior to commencement of construction, construction permits must be obtained from the administrative department in charge of construction for the local government at county level or above. The construction permit is granted only after planning and development approvals are obtained and evidence of funds for the project are provided, demonstrating that the design has been developed and drawings have been prepared, quality and safety procedures have been considered and so on. A construction permit will normally be issued within 15 days if an application meets the conditions. Construction, however, must commence within three months of issue otherwise the permit will become void.

To ensure responsibility on the quality of the construction works remains intact with the designated main contractor, the Construction Law prohibits dissection of the works into different parcels to be carried out by different contractors, that is, it is not allowed to build the podium of a project by one contractor and the towers on top by a different contractor.

CONSTRUCTION COST DATA

Cost of labour

The figures below are typical labour costs in Shanghai as at the fourth quarter of 2013. The wage rate indicated represents the amount paid to the employee, however, for the cost of employing that employee, additions would have to be made to these rates to cover a variety of mandatory and voluntary contributions – a list of items which could be included is given in Chapter 2.

	Wage rate (per month) Rmb	*Number of hours worked per year*
Site operatives		
Mason/bricklayer	2,500–3,500	2,080
Carpenter	3,000–4,000	2,080
Plumber	4,000–6,000	2,080
Electrician	4,000–6,000	2,080
Structural steel erector	2,500–3,500	2,080
HVAC installer	4,000–6,000	2,080
Semi-skilled worker	2,000–3,000	2,080
Unskilled labourer	1,800–3,000	2,080
Equipment operator	4,000–6,000	2,080
Watchman/security	2,000–3,000	2,080
Site supervision		
General foreman	14,000–15,000	2,080
Trades foreman	9,000–10,000	2,080
Clerk of works	14,000–15,000	2,080
Contractors' personnel		
Site manager	10,000–18,000	2,080
Resident engineer	8,000–14,000	2,080
Resident surveyor	8,000–14,000	2,080
Junior engineer	6,000–8,000	2,080
Junior surveyor	6,000–8,000	2,080
Planner	5,000–7,000	2,080
Consultants' personnel		
Senior architect	30,000–40,000	2,080
Senior engineer	30,000–40,000	2,080
Senior surveyor	30,000–40,000	2,080
Qualified architect	10,000–15,000	2,080
Qualified engineer	10,000–15,000	2,080
Qualified surveyor	10,000–15,000	2,080

Labour costs all across the country are on the rise. Inflation in 2013 was at 4%–6% p.a.

Cost of materials

Currently, China produces most of the materials and equipment required for development projects. The figures that follow are the costs of main construction materials, delivered to the site in Shanghai, as incurred by contractors in the fourth quarter of 2013. These assume that the materials

would be in quantities as required for a medium-sized construction project and that the location of the works would be neither constrained nor remote. All the costs in this section exclude business tax.

	Unit	*Cost Rmb*
Cement and aggregate		
Ordinary Portland cement in 50 kg bags	tonne	440
Coarse aggregates for concrete	tonne	90
Fine aggregates for concrete	tonne	95
Steel		
Mild steel reinforcement	tonne	3,800
High tensile steel reinforcement	tonne	4,000
Bricks and blocks		
Common bricks (240 × 115 × 53 mm)	1,000	Not used
Good-quality facing bricks (240 × 115 × 53 mm)	1,000	Not used
Hollow concrete blocks (390 × 115 × 190 mm)	1,000	1,790
Timber and insulation		
Softwood sections for carpentry	m^3	1,800
Softwood for joinery	m^3	2,000
Hardwood for joinery	m^3	Not used
Exterior quality plywood (18 mm thick)	m^2	45
Plywood for interior joinery (12 mm thick)	m^2	30
Hardwood strip flooring (15 mm thick)	m^2	150
100 mm thick quilt insulation	m^2	50
Hardwood internal door complete with frames and ironmongery	each	1,200
Glass and ceramics		
Float glass (4 mm)	m^2	30
Sealed double glazing units	m^2	150
Plaster and paint		
Good-quality ceramic wall tiles (152 × 152 mm)	m^2	50
Plaster in 50 kg bags	tonne	450
Plasterboard (12 mm thick)	m^2	20
Emulsion paint in 5-litre tins	kg	20
Gloss oil paint in 5-litre tins	kg	10
Tiles and paviors		
Clay floor tiles (200 × 200 × 8 mm)	m^2	50
Non-slip vinyl floor tiles (305 × 305 × 1.5 mm)	m^2	60

Continued

	Unit	*Cost Rmb*
Precast concrete paving slabs (490 × 490 × 40 mm)	m^2	60
Clay roof tiles (200 × 500 mm)	1,000	4,000
Precast concrete roof tiles (390 × 390 × 40 mm)	1,000	6,000
Drainage		
WC suite complete (set)	each	1,200
Lavatory basin complete (set)	each	700
100 mm diameter clay drain pipes (2500 mm long)	m	Not used
150 mm diameter cast iron drain pipes (1830 mm long)	m	180

Unit rates

The descriptions that follow are generally shortened versions of standard descriptions listed in full in Chapter 19. Where an item has a two-digit reference number (e.g., 05 or 33), this relates to the full description against that number in Chapter 19. Where an item has an alphabetic suffix (e.g. 12A or 34B) this indicates that the standard description has been modified. Where a modification is major the complete modified description is included here and the standard description should be ignored; where a modification is minor (e.g. the insertion of a named hardwood) the shortened description has been modified here but, in general, the full description in Chapter 19 prevails.

The unit rates that follow are for main work items on a typical construction project in Shanghai in the fourth quarter of 2013. The rates include all necessary labour, materials, equipment and an allowance to cover preliminary and general items. Five per cent should be added to the rates to cover contractors' overheads and profit. All the rates in this section exclude business tax.

		Unit	*Rate Rmb*
Excavation			
01	Mechanical excavation of foundation trenches	m^3	30
02	Hardcore filling making up levels (150 mm)	m^2	16
Concrete work			
04A	Plain *in situ* concrete in strip foundations in trenches (C30)[a]	m^3	500
05A	Reinforced *in situ* concrete in beds (C40)[a]	m^3	500
06A	Reinforced *in situ* concrete in walls (200 mm thick) (C40)[a]	m^3	500
07A	Reinforced *in situ* concrete in suspended floors or roof slabs (C40)[a]	m^3	500
08A	Reinforced *in situ* concrete in columns (C40)[a]	m^3	500

Continued

		Unit	*Rate Rmb*
09A	Reinforced *in situ* concrete in isolated beams (C40)[a]	m^3	500
10	Precast concrete slab	m^2	280
Formwork			
11	Softwood formwork to concrete walls	m^2	70
12	Softwood or metal formwork to concrete columns	m^2	70
13	Softwood or metal formwork to horizontal soffits of slabs	m^2	70
Reinforcement			
14	Reinforcement in concrete walls	tonne	5,000
15	Reinforcement in suspended concrete slabs	tonne	5,000
Steelwork			
17	Fabricate, supply and erect steel-framed structure	tonne	12,000
Brickwork and blockwork			
23A	Red brick wall (half-brick thick)	m^2	Not used
23B	Red brick wall (one-brick thick)	m^2	Not used
Roofing			
24A	Concrete interlocking roof tiles 490 × 490 mm	m^2	100
29A	Felt roof covering	m^2	100
Woodwork and metalwork			
34	Preservative-treated sawn softwood 50 × 100 mm	m	30
35	Preservative-treated sawn softwood 50 × 150 mm	m	30
37	Two-panel glazed door in hardwood, size 850 × 2000 mm	each	2,000
38	Solid core half-hour fire resisting hardwood internal flush door, size 800 × 2000 mm	each	1,500
41	Hardwood skirtings	m	35
Plumbing			
44A	Light gauge copper cold water tubing (20 mm diameter)	m	45
Sanitary ware			
48	White vitreous china WC suite	each	1,350
49	White vitreous china lavatory basin	each	850
Electrical work			
52A	PVC insulated and copper-sheathed cable (4 mm^2)	m	5
53	13 amp unswitched socket outlet	each	40
54	Flush mounted 20 amp, 1 way light switch	each	35

Continued

		Unit	*Rate Rmb*
Finishings			
55	Two coats gypsum-based plaster on brick walls	m^2	28
56A	White glazed tiles on plaster walls (P.C Rmb 80/m^2)	m^2	130
57A	Red clay quarry tiles on concrete floors (Ditto)	m^2	90
59	Thermoplastic floor tiles on screed	m^2	100
60	Mineral fibre tiles on concealed suspension system	m^2	160
Glazing			
61	Glazing to wood	m^2	250
Painting			
62	Emulsion on plaster walls	m^2	32
63	Oil paint on timber	m^2	35

[a] Concrete strength grades are based on PRC standard.

Approximate estimating

The building costs per unit area that follow are averages incurred by building clients for typical buildings in Shanghai as at the fourth quarter of 2013. They are based upon the total floor area of all storeys, measured between external walls and without deduction for internal walls.

Approximate estimating costs generally include mechanical and electrical installations but exclude furniture, loose or special equipment, and external works; they also exclude fees for professional services. The costs shown are for specifications and standards appropriate to China and this should be borne in mind when attempting comparisons with similarly described building types in other countries. A discussion of this issue is included in Chapter 2. Comparative data for countries covered in this publication, including construction cost data, are presented in Part III.

Approximate estimating costs must be treated with caution; they cannot provide more than a rough guide to the probable cost of building.

	Cost m^2 Rmb	*Cost ft^2 Rmb*
Industrial buildings		
Factories for letting	N/A	N/A
Factories for owner occupation (light industrial use)	3,700	344
Factories for owner occupation (heavy industrial use)	4,000	372
Factory/office (high-tech) for letting (shell and core only)	N/A	N/A

Continued

	Cost m² *Rmb*	*Cost ft²* *Rmb*
Factory/office (high-tech) for letting (ground floor shell, first floor offices)	N/A	N/A
Factory/office (high tech) for owner occupation (controlled environment, fully finished)	7,500	697
High tech laboratory workshop centres (air-conditioned)	9,000	836
Warehouses, low bay (6–8 m high) for letting (no heating)	N/A	N/A
Warehouses, low bay for owner occupation	5,000	465
Warehouses, high bay for owner occupation	6,000	557
Cold stores/refrigerated stores	10,000	929
Administrative and commercial buildings		
Civic offices, fully air-conditioned	11,000	1,022
Offices for letting, 5–10 storeys, air-conditioned	6,500	604
Offices for letting, high rise, air-conditioned	7,000	650
Offices for owner occupation high rise, air-conditioned	9,000	836
Prestige/headquarters office, 5–10 storeys, air-conditioned	8,500	790
Prestige/headquarters office, high rise, air-conditioned	10,000	929
Health and education buildings		
General hospitals (1000 beds)	10,000	929
Private hospitals (500 beds)	12,000	1,115
Health centres	7,000	650
Nursery schools	3,700	343
Primary/junior schools	3,700	343
Secondary/middle schools	4,400	409
University (arts) buildings	9,500	883
University (science) buildings	10,500	975
Management training centres	10,500	975
Recreation and arts buildings		
Theatres (>500 seats) including seating and stage equipment	12,500	1,161
Theatres (<500 seats) including seating and stage equipment	13,000	1,208
Concert halls including seating and stage equipment	12,500	1,161
Swimming pools (international standard) including changing and social facilities (outdoor)	each	5,000,000
Swimming pools (schools standard) including changing facilities (outdoor)	each	2,200,000
National museums including full air-conditioning and standby generator	16,000	1,486
Local museums including air-conditioning	13,000	1,208
City centre/central libraries	9,000	836
Branch/local libraries	7,500	697

Continued

	Cost m² Rmb	*Cost ft²* Rmb
Residential buildings		
Private/mass market single family housing two-storey detached/ semi-detached (multiple units)	4,500	418
Purpose designed single family housing two-storey detached (single unit)	5,500	511
Social/economic apartment housing, high rise (with lifts)	3,000	278
Private sector apartment building (standard specification)	5,000	465
Private sector apartment buildings (luxury)	10,000	929
Student/nurses halls of residence	7,300	678
Homes for the elderly (shared accommodation)	4,500	418
Homes for the elderly (self-contained with shared communal facilities)	5,000	465
Hotel, 5 star, city centre	15,000	1,394
Hotel, 3 star, city/provincial	8,000	743

Regional variations

The approximate estimating costs shown above are based on projects in Shanghai. For other parts of China, adjust these costs by the following factors:

Beijing	:	±0%
Guangzhou	:	–10%
Chongqing	:	–10%
Wuhan	:	–10%
Shenyang	:	–5%
Tianjin	:	–5%

Tax

The basic tax obligations of the construction industry are stipulated in the state finance and tax regulations.

Building materials and equipment imported to China must pay import duty. VAT is levied on the sales revenue of manufacturing companies, imported and exported goods and repair and processing services. Business tax is levied on the sales revenue of service firms, immovable property sales and intangible goods. The amount of business tax is dependent upon the industry, for construction it is currently 3%.

In certain regions, Land Appreciation Tax may be levied which applies to the gain arising from the transfer of real estate and is imposed on all entities or individuals, whether foreign or domestic.

Overall, the rules governing tax are complex and subject to change and it is recommended that a tax consultant's advice be sought on a case-by-case basis.

EXCHANGE RATES AND INFLATION

The combined effect of exchange rates and inflation on prices within a country and price comparisons between countries is discussed in Chapter 2.

Exchange rates

The United States and Europe has recently been exerting great pressure on China to appreciate the value of its currency, the Renminbi. China has been responding by a controlled escalation. Figure 5.1 plots the movement of the Chinese Renminbi against the sterling, the euro, the US dollar and 100 Japanese yen since 2003. The values used in the figure are quarterly and the method of calculating these is described and general guidance on the interpretation of the figure are provided in Chapter 2. The exchange rate in the fourth quarter of 2013 was Rmb 9.97 to pound sterling, Rmb 8.40 to euro, Rmb 6.12 to US dollar and Rmb 6.00–100 Japanese yen.

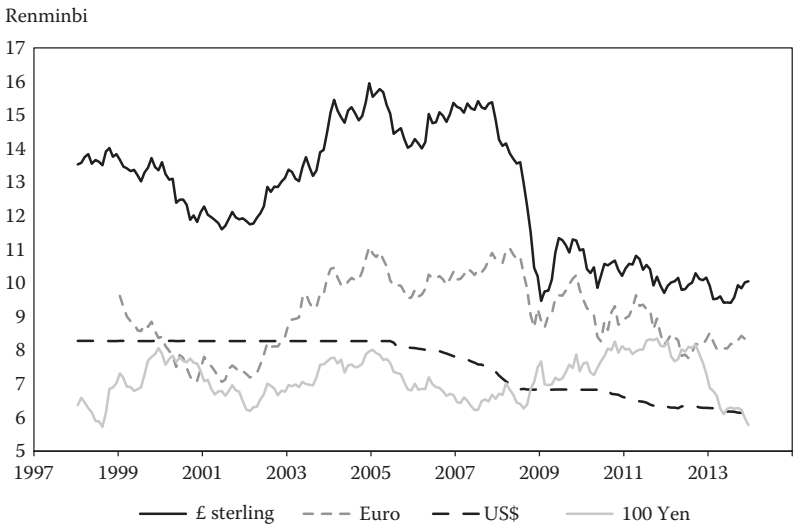

Figure 5.1 The Chinese Renminbi against sterling, euro, US dollar and 100 Japanese yen.

Table 5.6 Consumer price and construction cost inflation

	Consumer price inflation		*Construction cost index*	
Year	*Average index*	*Average change %*	*Average index*	*Average change %*
2003	101.2	1.2	102.2	2.2
2004	103.9	3.9	105.6	5.6
2005	101.8	1.8	101.6	1.6
2006	101.5	1.5	101.5	1.5
2007	104.8	4.8	103.9	3.9
2008	105.9	5.9	108.9	8.9
2009	99.3	–0.7	97.6	–2.4
2010	103.3	3.3	103.6	3.6
2011	105.4	5.4	106.6	6.6
2012	102.6	2.6	101.1	1.1
2013	103.1[a]	3.1	100.1[a]	0.1

Source: Consumer Price Index and Construction & Installation Price Index, National Bureau of Statistics.

Note: Preceding year index = 100.

[a] Figures for third quarter of the year.

Price inflation

The Consumer Price Index in mid-2013 recorded an annual increase of 2.6% between 2011 and 2012, which is slightly lower than the average rate of increase of 3.0% from 2003 to 2012. The Chinese have a dreaded memory of inflation that dated back to the pre-communist days. Prevention of inflation has therefore always been high on the agenda of the Central Government and strong administrative measures to keep it in check are quickly implemented. The annual increase of 2013 is anticipated to be around 3.5%–4.0%. Although the inflation is still considered being under control in the fast-growing economy, it is anticipated that the Central Government may pay special attention on maintaining a stable and low inflation rate in coming years. Table 5.6 shows the consumer price and construction cost inflation in China since 2003.

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*Those organisations marked with an asterisk have no official English name, the name indicated is an approximation based on the translation of the Chinese name.

Chapter 6

Hong Kong

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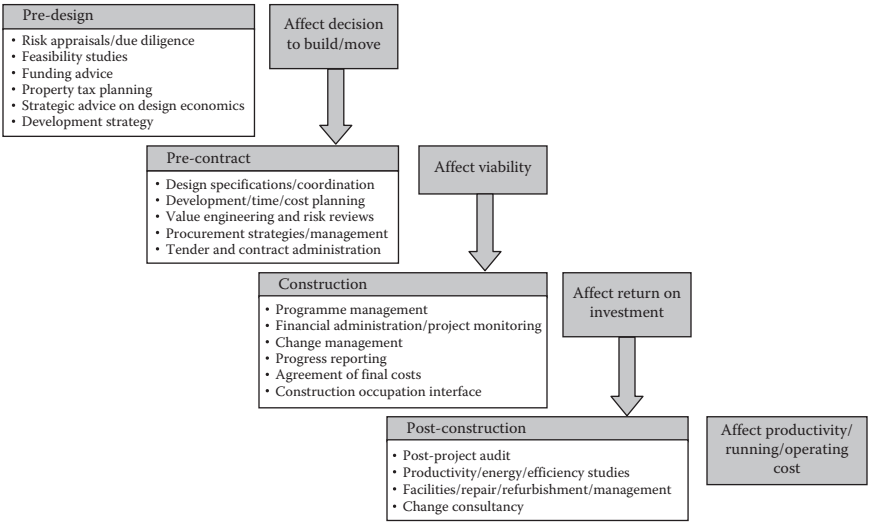

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All data relate to 2013 unless otherwise indicated.

Population	
Population (2013)[a]	7.22 mn
Urban population (census 2011)	94%
Population under 15	11.0%
Population 65 and over	14.5%
Average annual growth rate (2008–2013)	0.73%
Geography	
Land area	1,108 km^2
Agricultural area	6.1%
Capital city	–
Economy	
Monetary unit	Hong Kong Dollar (HK$)
Exchange rate (average fourth quarter 2013) to:	
The pound sterling	HK$12.55
The US dollar	HK$7.75
The euro	HK$10.56
The yen × 100	HK$7.72
Average annual inflation (2003–2013)	2.08%
Inflation rate	4.4%
Gross domestic product (GDP)	HK$2,097 bn
GDP per capita	HK$291,728
Average annual real change in (GDP) (1998–2013)	2.5%
Private consumption as a proportion of GDP	65.4%
Public consumption as a proportion of GDP	9.0%
Investment as a proportion of GDP	25.5%
Construction	
Gross value of construction output	HK$177 bn
Net value of construction output	HK$37.9 bn
Net value of construction output as a proportion of GDP	1.8%

[a] Provisional figures.

THE CONSTRUCTION INDUSTRY

Construction output

The construction industry suffered a severe setback after the Asian Financial Crisis in 1998. The gross value of construction work dropped to HK$90 billion in 2006 as compared to HK$133 billion at its peak in 1998. Conditions started to improve by the later part of 2006 and continued until 2008 when the global financial tsunami hits the economy again. The construction

output eventually picked up slowly from late 2009, due to roll-out of numerous large-scale public infrastructure projects and heating-up demand in the residential property sector. The construction industry continued its boom in 2013 with record of HK$176 billion in the end of year.

In the 2007–2008 Policy Address, the Chief Executive announced the undertaking of 10 major infrastructure projects to boost Hong Kong's regional competitiveness and to promote further integration with the adjoining cities of the Pearl River Delta and beyond. These 10 major infrastructure projects total to an estimated cost of HK$250 billion and comprise: (1) the South Island Rail Line; (2) the Shatin to Central Rail Link; (3) The Tuen Mun Western Bypass (TMWB) and Tuen Mun to Chek Lap Kok Link (TM-CLKL); (4) the Guangzhou–Shenzhen–Hong Kong Intercity Express Rail Link (XRL); (5) the Hong Kong–Zhuhai–Macao Bridge (HZMB); (6) the Hong Kong–Shenzhen Airport Rail Link; (7) the Hong Kong–Shenzhen joint development of the Lok Ma Chau Loop; (8) the West Kowloon Cultural District; (9) the Kai Tak Development which includes the new Cruise Terminal and (10) the establishment of New Development Areas (NDA).

The construction works for three railway projects have commenced, the South Island Rail Line and XRL are anticipated to be completed in 2015/2016. In addition, the TM-CLKL and HZMB have also commenced work and scheduled to be completed by 2018 and 2016, respectively.

In the 2013–2014 Policy Address, the Government announced that they will be focusing on the Kai Tak Development and two NDAs (North East New Territories NDA and Hung Shui Kiu NDA) to accommodate the new population. In addition to the 10 major infrastructure projects announced, in order to support boom of tourism by commissioning of HZMB in Lantau Island, the Government plans to develop the Eastern part of Lantau Island and the Artificial Island for Boundary Crossing Facilities, together to form a 'East Lantau Metropolis', to provide entertainment and hotel accommodation for tourists.

On the public housing side, the Hong Kong Housing Authority is targeting to build a total of 282,000 public housing units over the next 10 years – an average of 20,000 public rental housing (PRH) flats per year. By doing so, they will be able to comply with the target of maintaining the average waiting time for public rental flats to 3 years. They have also promised to resume the production of Home Ownership Scheme (HOS) flats which has been suspended since 2002, to provide 8,000 per year.

The Government had also launched a new scheme called 'My Home Purchase Plan' in the 2010–2011 Policy Address, providing small-scale units, which the tenants can purchase their flat with a subsidy equivalent to half of the net rental they have paid. The first estate named 'Green view Villa' in Tsing Yi will be available for sale in 2015, offering 988 flats.

Whilst spending on public works is increased, the spending for private sector work has not been left behind. During the recession, Hong Kong

Government adopted an Application List for Land Sales system in lieu of the old regular public auction system in response to the aspiration from the market. The Application List has continued to be in used until mid-2011. Its aim during then reduced the availability of new land plots for sales and directly affected land supply, one of the most scarce and valuable commodities in Hong Kong. However, this application list for land sales system was cancelled in April 2011 in order to increase land supply. The Government tend to follow the quarterly pre-announced land sales program and sell land by Tender or Auction to ensure sufficient amount of land for development are provided to the market. Conversion of use for privately owned sites has also been made more difficult in face of growing awareness of environmental concerns and historical heritage by the public. In order to resolve concerns regarding 'wall effects' caused by high-density buildings which affect ventilation and lead to heat islands, the Government has promised to review the outline zoning plans of each district with an aim to slightly lowering the overall plot ratio to reduce development density. According to figures released by the Transport and Housing Bureau, the number of residential units completed in 2008 was reduced to only 8,800 units as compared with 10,500 units in 2007, 16,600 units in 2006 and 17,300 units in 2005. However, the number of residential units completed increased to 13,400 units in 2010, and have since maintained at around 10,000 units from 2011 to 2013.

The difficulty in securing land for development has prompted many Hong Kong developers to cross the border and venture into the hot property market in China. From 2006 to 2013, Hong Kong developers have been buying land in China of sizes and at prices unheard of before. Their purchases are restricted not only to the main cities of Beijing, Shanghai, Guangzhou and Shenzhen, but also to many second-tier cities such as Chengdu, Chongqing, Dalian, Shenyang, Suzhou, Wuxi, Hangzhou, Zhengzhou and Xian, etc.

In general terms, overall expenditure on building and construction in Hong Kong is forecasted to increase in 2014, mainly due to an increase in Government spending.

Table 6.1 shows the expenditure on different types of construction works in 2013.

Characteristics and structure of the industry

As at 2013, there were around 270 approved contractors on the Hong Kong Government lists of approved contractors for public works. Contractors are classified into three groups as follows:

- Group A
  Bidding contracts of value not exceeding HK$75 million.

Table 6.1 Distribution of gross value of construction works (2013)

Types of work	%
Residential	34
Commercial	7
Industrial and storage	3
Service building	9
Transport	37
Other utilities and plant	3
Environment	6
Sports and recreation	1

Source: Works Digest, Government of the Hong Kong S.A.R.

- Group B
  Bidding contracts of value not exceeding HK$185 million.
- Group C
  Bidding contracts of value exceeding HK$185 million.

Contractors are classified into either Group A, B or C. They are further classified under their respective expertise into any or all of five possible categories: Buildings, Port Works, Roads and Drainage, Site Formation and Waterworks. In 2013, there were 57 contractors approved for building work contracts of value exceeding HK$185 million (Group C), 48 contractors approved for contracts up to HK$185 million (Group B) and 47 contractors approved for contracts up to HK$75 million (Group A).

The listings are mandatory when tendering for Government-funded projects only. There are no restrictions on private developers. However, in practice, private developers will usually make reference to the *Government List of Approved Contractors* when considering a particular contractor for their works.

For most projects, a main contractor is chosen and made responsible for constructing the project and employing approved subcontractors for major sections of works such as curtain walling or windows and building services. These specialist works may also be tendered separately and nominated to the main contractor as nominated subcontractors.

Recently, Government has been using Design-and-Build contracts for selected projects to enhance administration and budgetary control. Notable projects awarded under such arrangement include the Civil Aviation Department Building, the Customs and Excise Department Building and the highly publicised Tamar Development, which covers the Central Government Complex, the Legislative Council Complex, the Chief Executive's Office and public open space. However, this arrangement is not widespread amongst the private sector.

The main contracting system consists of a multi-layered subcontracting whereby the main contractor employs subcontractors who in turn employ a host of smaller subcontractors usually providing workers only. The system gives the whole industry a high flexibility and assists to keep costs down. However, it also gives rise to vague lines of responsibility and difficulties in tracking the workers on site. The majority of construction workers are engaged on a daily basis with only a very small percentage being employed by the month. Unionization is not strong and there have been numerous cases of the head of a subcontractor abandoning their employees without paying them their due salaries. These incidents lead to demonstrations on sites which are usually politicised. To ensure that main contractors administer proper governance of their subcontractors and to minimise the number of incidents, Government passed a legislation making it mandatory for the main contractors to be liable for a maximum of 2 months of wages in arrears for workers working on their sites, irrespective of whether they were directly employed by the main contractors themselves or not. The main contractor may try to recover the sum from the direct employers of the workers through civil claim proceedings.

Another drawback of the multi-layered subcontracting system is the difficulty to ensure whether the workers themselves are skilled in their respective trades or not. To address the problem, the Government established a Construction Workers Registration System under the Construction Workers Registration Authority to keep a central record of the skill levels of all construction workers in Hong Kong. The Construction Industry Council is delegated by the Authority to run the Registrar which commenced operation in December 2005. A levy of 0.03% on the value of all construction works exceeding HK$1 million in contract value is charged to pay for the working of the registration system.

The Construction Industry Council also runs training centres and provides basic courses for craftsmen and technicians. On completion of these courses, trainees are apprenticed to building contractors for a period of two or three years. The Council is funded by a special levy on newly completed construction works. Currently the rate paid by contractors is 0.5% of the value of work all construction works with contract values exceeding HK$1 million.

The construction industry depends heavily on imported materials. Government specifications still rely heavily on British Standards to define the pre-requisite quality levels. However, the use of ‘equivalents’ subject to testing and approvals are becoming common. Hong Kong is a free port and has few import restrictions. Import licences are generally not required and duties are not applicable except for some specific items. Sales or purchase taxes are not applicable to construction materials or equipment. Because of the dependence of Hong Kong on imports, the prices of materials are heavily influenced by exchange rates. A significant amount of basic building materials are imported from China nowadays. The pegging of the Hong

Kong dollar to the US dollar has caused the Hong Kong dollar to depreciate against the Renminbi and has been pushing up the price of imports from China, causing construction prices to rise.

Clients and finance

In 2013, the private sector accounted for about 44% and the public sector about 56% of all new works in Hong Kong.

Public sector works mainly come from the Transport and Housing Bureau which supervises the Transport Department, the Civil Aviation Department, the Highways Department, the Marine Department and the Housing Department. The Secretary for Transport and Housing also serves as the Chairman of the Hong Kong Housing Authority. The Secretary for Transport and Housing is assisted by the Permanent Secretary for Transport and Housing (Housing), who also assumes the office of the Director of Housing. The Hong Kong Housing Authority is a statutory body established in April 1973 under the Housing Ordinance. It was previously responsible for coordinating public housing but since April 1988, it has been responsible for nearly all public housing in Hong Kong including policy formulation. The Housing Authority is required to be self-financing. It operates a comprehensive construction division encompassing architectural, engineering, building services, quantity surveying, planning, construction supervision and maintenance divisions.

Other sources of public works come from the numerous quasi-government organisations. The University Grants Committee controls funding to the eight higher education institutions including the City University of Hong Kong (CityU), the Hong Kong Baptist University (HKBU), the Lingnan University (LU), the Chinese University of Hong Kong (CUHK), the Hong Kong Institute of Education (HKIEd), the Hong Kong Polytechnic University (PolyU), the Hong Kong University of Science and Technology (HKUST) and the University of Hong Kong (HKU). The Hospital Authority manages all 41 public hospitals and institutions. The Urban Renewal Authority is entrusted with acquisition of deteriorating properties for en bloc redevelopments and tends to carry out most of its developments in joint venture with private developers.

Private building works are mainly financed by property developers and by large enterprises such as Cheung Kong, Hutchison Whampoa, Sun Hung Kai, Henderson, Wharf, Swire, Hong Kong Land, New World, Hysan, Kerry, China Resources, K Wah, Sino, USI, China Overseas, PCCW and Hong Kong Bank. The property developers in Hong Kong tend to be large and sophisticated. All of them have their own in-house project management departments and some, like Sun Hung Kai, Henderson and China Resources, even have their own contracting arm and/or sales division.

Another major source of funds for development is The Hong Kong Jockey Club. Of the very large sums of money which accrue to the Club from racing and lotteries, the majority is of course returned to the punters. However, the Club donates heavily to charity organisations and regularly finances community development projects. For example, the University of Science and Technology, Kowloon Park, the Hong Kong Academy for Performing Arts, the Ocean Park, the Hong Kong Park, the Hong Kong Stadium and the Kau Sai Chau Public Golf Course were either partially or wholly funded by this body.

Another new source of work for contractors and consultants in Hong Kong is the large amount of construction works built in nearby Macau. Most of the new casinos, hotels and luxury apartments built in this small enclave from 2004 to 2008 were carried out by Hong Kong contractors and workers. However, following tightening of permit issues by China for mainland visitors and the credit crunch caused by the global financial tsunami in 2008, works in Macau reduced drastically in 2009.

Selection of design consultants

Hong Kong has a large number of well-established firms of architects, both of overseas and local origin. There are many foreign architects, mainly from the United Kingdom, Australia and the United States, working in Hong Kong. Small interior design and minor work practices proliferate on the back of the never-ending fitting out of offices, shops, flats and the like. All public work, such as hospitals, schools, museums and council chambers fall under the ambit of the Architectural Services Department who may carry out the design themselves or outsource the work to private architects, engineers and quantity surveyors. The Housing Authority also has a similar policy of outsourcing.

The main professional bodies in the construction industry are the Hong Kong Institute of Architects with approximately 2,500 members and the Hong Kong Institute of Engineers with approximately 12,000 members. On many larger schemes, a project manager may be appointed to replace the architect as the project coordinator. Most of the large engineering firms also provide project management/coordination services.

The profession of the quantity surveyor is recognised in Hong Kong but there is no compulsory registration requirement except for undertaking Government projects. Anyone can set up as a quantity surveyor or cost consultant practice and undertake quantity surveying work for private developments. The Hong Kong Institute of Surveyors (HKIS) was established in 1984 to take over the role of the Royal Institution of Chartered Surveyors (RICS) for education and professional qualification assessment in the territory. The HKIS and the RICS have a reciprocity agreement whereby members of the RICS are eligible for HKIS membership after working for 1 year in

Hong Kong and vice versa. However, the existing memorandum of Mutual Recognition of Membership between HKIS and RICS has ceased with effect from January 2014. The RICS re-opened their Hong Kong Branch in 2003 mainly to serve their members in Hong Kong.

There are no hard and fast guidelines for selection of consultants and the Government changes their selection criteria every now and then. The Government requires their consultants, as well as contractors, to operate a Quality Assurance System to ISO 9000. Tenders are called for nearly all consultancy appointments and are handled on a two-envelope system with different weightings given for the technical and the financial submissions.

Architects are appointed directly by the client and may or may not be required to include the structural engineer and the building services engineer under their appointment.

Quantity surveyors and cost consultants are normally appointed separately by the client and report directly to him. Price is always a substantial criterion in both the public and private sector and usually a lump sum fee is used in the consultancy contracts.

All the main professional bodies publish non-mandatory fee scales and they are sometimes used for public work as well as for private sector work. However, it is not known how often they are used or what discounts are negotiated. Fees, generally, are being driven down by competition.

Contractual arrangements

The majority of contracts are awarded on a lump sum basis based on competitive tenders received from a list of firms that have been selected by the clients and their consultants. The Government has a mandatory tendering process to ensure fairness and openness. This is followed by the quasi-government organisations and even by many private developers. Generally, tenders are based on measured bills of quantities though other contractual arrangements may sometimes be used.

The most common Form of Contract used in Hong Kong for private clients is the *Agreement and Schedule of Conditions of Building Contract for use in the Hong Kong SAR* (*the Hong Kong Standard Form of Contract*), *2005 Edition*, issued jointly by the Hong Kong Institute of Architects, the Hong Kong Institute of Surveyors and the Hong Kong Institute of Construction Managers. There are two versions available; one is the 'with quantities' form which assumes the use of measured bills of quantities that are normally prepared by the quantity surveyor; the other is the 'without quantities' version.

It is normal for these contracts to be modified by a series of special conditions, introduced by the client or his advisors which serve to supplement the general conditions of contract to suit particular requirements of individual projects.

The Hong Kong Government has three separate Forms of Contract for use in the construction industry:

- General Conditions of Contract for Building Works (1999 Edition)
- General Conditions of Contract for Civil Engineering Works (1999 Edition)
- General Conditions of Contract for Electrical and Mechanical Engineering Works (1999 Edition)

Contracts are generally awarded based on a firm price basis, the client being keen to eliminate the cost uncertainty associated with fluctuations. Public clients, such as the Architectural Services Department and the Housing Authority, adopt a Contract Price Fluctuation System (CPFS) for their projects unless there are practical problems for not doing so. Under the CPFS provisions stipulated by the Development Bureau, fluctuations are normally given for both labour and materials, calculated by means of a formula using data issued by the Government Census and Statistics Department. Other alternative contractual arrangements used include management contracting, design-and-build, cost plus and construction management. However, most of these alternatives do not have standard contract forms for use in Hong Kong and if adopted, standard forms from foreign countries (usually from the United Kingdom) would have to be tailored to fit.

Liability and insurance

Any departure by either party from the strict terms of the agreement is a technical breach of contract and therefore actionable at law with the remedy of damages. However, most contracts will have settlement procedures (e.g. dispute resolution, mediation and arbitration) built into the agreement. The courts will, in most cases, seek to ensure that such procedures have been tried or were inapplicable to the circumstances which have arisen. For a contract executed under hand, claims for breach of contract may only be made within six years from the date of the breach. Where a contract is executed under seal, that period is extended to 12 years.

The contractor is also liable in common law to exercise proper skill and care in his operations. Such liability would apply between two parties even if they have no direct contractual connection. It would be sufficient to demonstrate that one party owes a duty of care to the other party.

The consultants have a contractual relationship only with their Employer (the client) via their contract of service. Breach of their contract of service which affects the contractor may only be remedied by the contractor suing the Employer and the Employer in turn taking action against the consultants. Most clients require their consultants to provide professional indemnity insurance to ensure appropriate protection. Consultants and contractors

may also be subject to criminal sanctions or claims for breach of statutory duties if the parties fail to comply with the local legislative framework. A typical example would be a breach of *Health & Safety Statutes*.

All nominated subcontractors are required to be subject to broadly the same terms as the main contractor and to indemnify the main contractor against the same liabilities as the main contractor himself might bear. In the *Standard Hong Kong Form of Contract*, there is no contractual relationship between the Employer and the nominated subcontractor. In response to this, it is common for the Employer to enter into a collateral agreement with the nominated subcontractor in order to create a contractual link.

Insurances, covering the construction works themselves, people/employees engaged in the works and third-party/public liability, are addressed in the *Standard Forms of Contract*.

Development control and standards

There is no freehold property in Hong Kong and the Government owns all land and allocates its use in accordance with outline zoning plans. Planning laws are not too onerous but are currently being tightened. Planning and control of development is the responsibility of the Town Planning Board and the Planning Department. The use of a site is designated by means of outline *Zoning Plans* and a plot ratio and height limit are set and then leases are auctioned. The shortage of land in Hong Kong means that typically more than 70% of the cost of a city centre development is in land cost. Land auctions are an important source of revenue for the Exchequer. Applications to modify the zoning of a particular site may be made to the Town Planning Board. If approved, the case will be passed to the Lands Department who will determine the conversion premium. The conversion premium is a payment made to the Government calculated on the enhanced market value of a site based on its new designated use or increased development area. Often the premium can be quite significant.

Planning applications are made to the Buildings Department and decisions are normally given within three months of submission. Typically there will be some negotiation with the Planners and a resubmission may be necessary. All projects must comply with the government regulations of which the main one is the *Buildings Ordinance* (*Cap 123 of the Laws of Hong Kong*). Building control is exercised through the appropriate department of the Buildings Department, which approves development and building plans ensuring that they comply with the relevant regulations. During construction, the Architect is directly responsible to the Buildings Department and 'spot' site inspections are carried out regularly.

Geotechnical conditions in Hong Kong are a major factor in any development. Piling or other major foundation work together with slope stabilisation is the 'norm'. Calculations and construction details for these items are

submitted to the Buildings Department for approval. An advisory service is also provided by the Geotechnical Engineering Office.

There is also a move to raise environmental sustainability in new buildings. In line with the Action Blue Sky Campaign launched by the Hong Kong Government as a commitment for environment protection, Hong Kong has pledged to achieve a reduction in energy intensity of at least 25% by 2030 (with 2005 as the base year). The Government stipulated certain green features as part of the pre-requisites of GFA concession in new buildings, which are to be certified under BEAMPlus green building certification by the Hong Kong Green Building Council (HKGBC). To this end, the Government has launched an Ordinance named The Buildings Energy Efficiency Ordinance (Chapter 610), which requires the newly constructed buildings to comply with the design standards of the Building Energy Code (BEC), aiming at improving energy efficiency. It will also take the lead by conducting Carbon Audits and implementing emissions reduction provisions to their own new major projects, such as the Tamar Complex.

CONSTRUCTION COST DATA

Cost of labour

The figures that follow are typical of labour costs in Hong Kong as at the fourth quarter of 2013. The wage rate is the basis of an employee's income, while the cost of labour indicates the cost to a contractor of employing that employee. The difference between the two covers a variety of mandatory and voluntary contributions – a list of items which could be included is given in Chapter 2.

	Wage rate (per day) HK$	*Cost of labour (per day) HK$*	*Number of hours worked per year*
Site operatives			
Bricklayer	1,200	1,320	2,400
Mason	1,200	1,320	2,400
Carpenter	1,510	1,660	2,400
Plumber	1,100	1,210	2,400
Electrician	1,020	1,120	2,400
Structural steel erector	1,660	1,830	2,400
Semi-skilled worker	720	790	2,400
Unskilled labourer	690	760	2,400
Equipment operator	1,000	1,100	2,400
	(per month)	*(per month)*	
Watchman/security	12,000	13,200	2,400

Continued

	Wage rate (per month) HK$	*Cost of labour (per month) HK$*	*Number of hours worked per year*
Site supervision			
General foreman	35,000	38,500	2,400
Trades foreman	30,000	33,000	2,400
Clerk of works	45,000	49,500	2,400
Contractors' personnel			
Site manager	69,000	75,900	2,400
Resident engineer	50,000	55,000	2,400
Resident surveyor	45,000	49,500	2,400
Junior engineer	24,000	26,400	2,400
Junior surveyor	20,000	22,000	2,400
Planner	35,000	38,500	2,400
Consultants' personnel			
Senior architect	80,000	88,000	2,100
Senior engineer	65,000	71,500	2,100
Senior surveyor	55,000	60,500	2,100
Qualified architect	50,000	55,000	2,100
Qualified engineer	43,000	47,300	2,100
Qualified surveyor	40,000	44,000	2,100

Cost of materials

The figures that follow are the costs of main construction materials, delivered to site in the Hong Kong area, as incurred by contractors in the fourth quarter of 2013. These assume that the materials would be in quantities as required for a medium-sized construction project and that the location of the works would be neither constrained nor remote.

	Unit	*Cost HK$*
Cement and aggregate		
Ordinary Portland cement in 50 kg bags	tonne	700
Coarse aggregates for concrete	m^3	96
Fine aggregates for concrete	m^3	124
Ready mixed concrete (Grade 40)	m^3	800
Ready mixed concrete (Grade 10)	m^3	650
Steel		
Mild steel reinforcement	tonne	6,000
High tensile steel reinforcement	tonne	5,200
Structural steel sections	tonne	11,800

Continued

	Unit	*Cost HK$*
Bricks and blocks		
Common bricks (225 × 105 × 70 mm)	1,000	1,700
Good-quality facing bricks (225 × 105 × 70 mm)	1,000	2,100
Hollow concrete blocks (300 × 150 × 75 mm)	1,000	2,500
Solid concrete blocks (300 × 150 × 75 mm)	1,000	3,000
Precast concrete cladding units with exposed aggregate finish	m^2	3,000
Timber and insulation		
Softwood sections for carpentry	m^3	4,300
Softwood for joinery	m^3	4,600
Hardwood for joinery	m^3	5,500
Exterior quality plywood (19 mm)	m^2	75
Plywood for interior joinery (19 mm)	m^2	67
Softwood strip flooring (25 mm)	m^2	330
Chipboard sheet flooring (19 mm)	m^2	76
100 mm thick quilt insulation	m^2	76
100 mm thick rigid slab insulation	m^2	120
Softwood internal door complete with frames and ironmongery	each	2,200
Glass and ceramics		
Float glass (6 mm)	m^2	150
Sealed double glazing units (4 × 4 m)	m^2	850
Plaster and paint		
Good-quality ceramic wall tiles (150 × 75 mm)	m^2	100
Plasterboard (12 mm thick)	m^2	150
Emulsion paint in 5 litre tins	litre	52
Gloss oil paint in 5 litre tins	litre	70
Tiles and paviors		
Clay floor tiles (250 × 250 × 20 mm)	m^2	80
Vinyl floor tiles (300 × 300 × 2.3 mm)	m^2	100
Precast concrete paving slabs (250 × 250 × 25 mm)	m^2	170
Clay roof tiles	1,000	5,500
Precast concrete roof tiles (300 × 300 × 25 mm)	1,000	12,000
Drainage		
WC suite complete	each	2,500
Lavatory basin complete	each	2,200
150 mm diameter cast iron drain pipes	m	250

Unit rates

The descriptions that follow are generally shortened versions of standard descriptions listed in full in Chapter 19. Where an item has a two-digit reference number (e.g. 05 or 33), this relates to the full description against that number in Chapter 19. Where an item has an alphabetic suffix (e.g. 12A or 34B) this indicates that the standard description has been modified. Where a modification is major the complete modified description is included here and the standard description should be ignored; where a modification is minor (e.g. the insertion of a named hardwood) the shortened description has been modified here but, in general, the full description in Chapter 19 prevails.

The unit rates that follow are for main work items on a typical construction project in Hong Kong in the fourth quarter of 2013. The rates include all necessary labour, materials and equipment. Allowances to cover preliminary and general items and contractor's overheads and profit have been added to the rates.

		Unit	*Rate HK$*
Excavation			
01	Mechanical excavation of foundation trenches	m^3	160
02	Hardcore filling making up levels	m^3	800
03	Earthwork support	m^2	2,000
Concrete work			
04	Plain *in situ* concrete in strip foundations in trenches	m^3	1,040
05	Reinforced *in situ* concrete in beds	m^3	1,250
06	Reinforced *in situ* concrete in walls	m^3	1,250
07	Reinforced *in situ* concrete in suspended floors or roof slabs	m^3	1,250
08	Reinforced *in situ* concrete in columns	m^3	1,250
09	Reinforced *in situ* concrete in isolated beams	m^3	1,250
10	Precast concrete slab	m^2	3,000
Formwork			
11	Softwood formwork to concrete walls	m^2	320
12	Softwood formwork to concrete columns	m^2	320
13	Softwood formwork to horizontal soffits of slabs	m^2	320
Reinforcement			
14	Reinforcement in concrete walls	tonne	10,200
15	Reinforcement in suspended concrete slabs	tonne	10,200
16	Fabric reinforcement in concrete beds	m^2	110

Continued

		Unit	Rate HK$
Steelwork			
17	Fabricate, supply and erect steel framed structure	tonne	33,000
18	Framed structural steelwork in universal joist sections	tonne	33,000
19	Structural steelwork lattice roof trusses	tonne	36,000
Brickwork and blockwork			
20	Precast lightweight aggregate hollow concrete block walls	m^2	250
21	Solid (perforated) concrete blocks	m^2	300
22	Sand lime bricks	m^2	350
23	Facing bricks	m^2	380
Roofing			
24	Concrete interlocking roof tiles 430 × 380 mm	m^2	560
25	Plain clay roof tiles 260 × 160 mm	m^2	490
27	Sawn softwood roof boarding	m^2	350
28	Particle board roof coverings	m^2	320
29	Three layers glass-fibre-based bitumen felt roof covering	m^2	250
30	Bitumen-based mastic asphalt roof covering	m^2	210
31	Glass-fibre mat roof insulation 160 mm thick	m^2	210
32	Rigid sheet load bearing roof insulation 75 mm thick	m^2	180
33	Troughed galvanised steel roof cladding	m^2	560
Woodwork and metalwork			
34	Preservative-treated sawn softwood 50 × 100 mm	m	150
35	Preservative-treated sawn softwood 50 × 150 mm	m	200
36	Single glazed casement window in hardwood, 650 × 900 mm	each	2,300
37	Two-panel glazed door in hardwood, size 850 × 2000 mm	each	5,500
38	Solid core half hour fire resisting hardwood internal flush door, size 800 × 2000 mm	each	4,900
39	Aluminium double-glazed window, size 1200 × 1200 mm	each	4,800
40	Aluminium double-glazed door, size 850 × 2100 mm	each	9,000
41	Hardwood skirtings	m	70
Plumbing			
42	UPVC half-round eaves gutter	m	280
43	UPVC rainwater pipes	m	350
44	Light gauge copper cold water tubing	m	350
45	High-pressure plastic pipes for cold water supply	m	250
46	Low-pressure plastic pipes for cold water distribution	m	200
47	UPVC soil and vent pipes	m	350

Continued

		Unit	*Rate HK$*
48	White vitreous China WC suite	each	3,900
49	White vitreous China lavatory basin	each	3,600
50	Glazed fireclay shower tray	each	2,300
51	Stainless-steel single bowl sink and double drainer	each	3,500
Electrical work			
52	PVC insulated and copper-sheathed cable	m	50
53	13 amp unswitched socket outlet	each	460
54	Flush-mounted 20 amp, 1-way light switch	each	810
Finishings			
55	Two coats gypsum-based plaster on brick walls	m^2	170
56	White-glazed tiles on plaster walls	m^2	380
57	Red clay quarry tiles on concrete floors	m^2	350
58	Cement and sand screed to concrete floors	m^2	120
59	Thermoplastic floor tiles on screed	m^2	250
60	Mineral fibre tiles on concealed suspension system	m^2	420
Glazing			
61	Glazing to wood	m^2	320
Painting			
62	Emulsion on plaster walls	m^2	60
63	Oil paint on timber	m^2	120

Approximate estimating

The building costs per unit area that follow are averages incurred by building clients for typical buildings in the Hong Kong area as at the fourth quarter of 2013. They are based upon the total floor area of all storeys, measured between external walls and without deduction for internal walls.

Approximate estimating costs generally include mechanical and electrical installations but exclude furniture, loose or special equipment and external works; they also exclude fees for professional services. The costs shown are for specifications and standards appropriate to Hong Kong and this should be borne in mind when attempting comparisons with similarly described building types in other countries. A discussion of this issue is included in Chapter 2. Comparative data for countries covered in this publication, including construction cost data, are presented in Part III.

Approximate estimating costs must be treated with caution; they cannot provide more than a rough guide to the probable cost of building.

	Cost m^2 *HK$*	*Cost* ft^2 *HK$*
Industrial buildings		
Factories for letting	18,100	1,681
Factories for owner occupation (light industrial use)	19,500	1,812
Factories for owner occupation (heavy industrial use)	21,600	2,007
Factory/office (high-tech) for letting (shell and core only)	16,500	1,533
Factory/office (high-tech) for letting (ground floor shell, first floor offices)	18,000	1,672
Factory/office (high tech) for owner occupation (controlled environment, fully finished)	19,500	1,812
High tech laboratory workshop centres (air-conditioned)	50,500	4,691
Warehouses, low bay (6–8 m high) for letting (no heating)	16,500	1,533
Warehouses, low bay for owner occupation	18,000	1,672
Warehouses, high bay for owner occupation	20,000	1,858
Cold stores/refrigerated stores	37,900	3,521
Administrative and commercial buildings		
Civic offices, fully air-conditioned	34,900	3,242
Offices for letting, 5–10 storeys, air-conditioned	22,700	2,109
Offices for letting, high rise, air-conditioned	24,600	2,285
Offices for owner occupation high rise, air-conditioned	28,900	2,685
Prestige/headquarters office, 5–10 storeys, air-conditioned	29,600	2,750
Prestige/headquarters office, high rise, air-conditioned	31,400	2,917
Health and education buildings		
General hospitals (1000 beds)	40,200	3,735
Private hospitals (500 beds)	46,200	4,292
Health centres	21,300	1,979
Nursery schools	18,200	1,691
Primary/junior schools	19,700	1,830
Secondary/middle schools	20,300	1,886
University (arts) buildings	28,000	2,601
University (science) buildings	40,700	3,781
Management training centres	25,000	2,323
Recreation and arts buildings		
Theatres (>500 seats) including seating and stage equipment	40,000	3,716
Theatres (<500 seats) including seating and stage equipment	39,500	3,670
Concert halls including seating and stage equipment	40,000	3,716
Swimming pools (international standard) including changing and social facilities (outdoor)	each	24,000,000

Continued

	Cost m^2 HK$	*Cost ft^2 HK$*
Swimming pools (schools standard) including changing facilities (outdoor)	each	8,000,000
National museums including full air-conditioning and standby generator	45,600	4,236
Local museums including air-conditioning	38,000	3,530
City centre/central libraries	30,400	2,824
Branch/local libraries	25,900	2,406
Residential buildings		
Private/mass market single family housing two-storey detached/semi-detached (multiple units)	33,400	3,103
Purpose designed single family housing two-storey detached (single unit)	43,500	4,041
Social/economic apartment housing, high rise (with lifts)	10,600	985
Private sector apartment building (standard specification)	24,600	2,285
Private sector apartment buildings (luxury)	33,000	3,066
Student/nurses halls of residence	18,000	1,672
Homes for the elderly (shared accommodation)	19,800	1,839
Homes for the elderly (self contained with shared communal facilities)	21,000	1,951
Hotel, 5 star, city centre	33,200	3,084
Hotel, 3 star, city/provincial	30,200	2,806

EXCHANGE RATES AND INFLATION

The combined effect of exchange rates and inflation on prices within a country and price comparisons between countries is discussed in Chapter 2.

Exchange rates

Figure 6.1 plots the movement of the Hong Kong dollar against the sterling, the euro, the US dollar and 100 Japanese yen since 2003. The values used in the figure are quarterly and the method of calculating these is described and general guidance on the interpretation of the figure are provided in Chapter 2. The average exchange rate in the fourth quarter of 2013 was HK$12.55 to pound sterling, HK$10.56 to euro, HK$7.75 to US dollar and HK$7.72 to 100 Japanese yen.

Price inflation

Table 6.2 presents consumer price, building cost and tender price inflation in Hong Kong since 1998.

Figure 6.1 The Hong Kong dollar against sterling, euro, US dollar and 100 Japanese yen.

Table 6.2 Consumer price, building price and tender price inflation

	Consumer price inflation		*Building cost index*		*Tender price index*	
Year	*Average index*	*Average change %*	*Average index*	*Average change %*	*Average index*	*Average change %*
1998	100.0	2.9	100.0	7.4	100.0	9.1
1999	96.1	−3.9	101.4	1.4	95.6	−4.4
2000	92.5	−3.7	103.2	1.8	83.0	−13.2
2001	91.0	−1.6	103.5	0.3	75.9	−8.6
2002	88.2	−3.1	103.2	–0.3	67.1	−11.6
2003	85.9	−2.6	102.2	–1.0	66.9	−0.3
2004	85.6	−0.3	101.0	–1.2	65.8	−1.6
2005	86.4	0.9	98.9	–2.1	66.8	1.5
2006	88.1	2.0	98.9	–	70.1	4.9
2007	89.9	2.0	99.9	1.0	84.2	20.1
2008	93.8	4.3	Ceased publication		119.5	41.9
2009	94.3	0.5	–	–	100.5	−15.9
2010	96.5	2.3	–	–	113.0	12.4
2011	101.6	5.3	–	–	126.2	11.7
2012	105.7	4.0	–	–	136.7	8.3
2013	110.3	4.4	–	–	143.3	4.8

Source: Census and Statistics Department, Hong Kong SAR; Architectural Services Department, Hong Kong SAR.

The year-on-year rate of increase in the tender price index has been increasing since 2005 (with the exception of 2009). Following the reduction in work since the Asian Financial Crisis in 1998, both the number of construction firms and site workers have shrunk. According to the Census and Statistics Department, there are approximately 299 main contractors and 50,185 workers on site in 2007, down from 371 and 70,941, respectively, in 1999. Supply has, therefore, become more inelastic than before. With the increase in demand brought in by the Government spending and the work in Macau and China, tender prices had been rising at a steep pace from 2007 to 2013.

Since 2009, the increase rate of tender prices has moderated due to sharp declines in the cost of steel reinforcement, copper and other materials. Whilst the costs of some materials have declined, tenderers, on the other hand, have shown higher caution towards tenders due to the uncertain financial outlook. This has resulted in variance of tender prices that vary from project to project.

Based on the above, construction prices are expected to be volatile in the near future before resuming an upward trend after the effects of the global financial tsunami subsides.

USEFUL ADDRESSES

Public Organisations

Airport Authority
HKIA Tower, 1 Sky Plaza Road
Hong Kong International Airport
Lantau
Hong Kong
Tel: (852) 2181 8888
Fax: (852) 2824 0717
Website: www.hongkongairport.com

Architectural Services Department
35/F, Queensway
Government Offices
66 Queensway
Hong Kong
Tel: (852) 2867 3628
Fax: (852) 2869 0289
E-mail: archsd@archsd.gov.hk
Website: www.archsd.gov.hk

Buildings Department
12/F Pioneer Centre
750 Nathan Road
Mongkok
Kowloon
Tel: (852) 2626 1616
Fax: (852) 2537 4992
E-mail: enquiry@bd.gov.hk
Website: www.bd.gov.hk

Census and Statistics Department
16/F-22/F and 25/F, Wanchai Tower
12 Harbour Road
Wan Chai
Hong Kong
Tel: (852) 2582 4807
Fax: (852) 2802 4000
E-mail: gen-enquiry@censtatd.gov.hk
Website: www.censtatd.gov.hk

Civil Engineering and Development Department
101 Princess Margaret Road
Kowloon
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Tel: (852) 2762 5111
Fax: (852) 2714 0140
E-mail: enquiry@cedd.gov.hk
Website: www.cedd.gov.hk

Construction Industry Council
15/F, Allied Kajima Building
138 Gloucester Road, Wanchai
Hong Kong
Tel: (852) 2100 9000
Fax: (852) 2100 9090
E-mail: enquiry@hkcic.org
Website: www.hkcic.org

Electrical and Mechanical Services Department
3 Kai Shing Street
Kowloon
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Tel: (852) 2333 3762

Fax: (852) 2890 7493
E-mail: info@emsd.gov.hk
Website: www.emsd.gov.hk

Environmental Protection Department
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Hong Kong
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Fax: (852) 2838 2155
E-mail: enquiry@epd.gov.hk
Website: www.epd.gov.hk

Highways Department
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Ho Man Tin
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Fax: (852) 2714 5216
E-mail: enquiry@hyd.gov.hk
Website: www.hyd.gov.hk

Hong Kong Housing Authority
Hong Kong Housing Authority Headquarters
33 Fat Kwong Street
Ho Man Tin
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Tel: (852) 2712 2712
Fax: (852) 2624 5685
E-mail: hkha@housingauthority.gov.hk
Website: www.housingauthority.gov.hk

Lands Department
20/F, North Point Government Offices
333 Java Road
North Point
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Tel: (852) 2231 3294
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Planning and Lands Branch
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Urban Renewal Authority
26/F COSCO Tower
183 Queen's Road Central
Hong Kong
Tel: (852) 2588 2333
Fax: (852) 2827 0176/(852) 2827 0085
E-mail: inquiry@mail1.ura.org.hk
Website: www.ura.org.hk

Water Supplies Department
48/F, Immigration Tower
7 Gloucester Road
Wanchai
Hong Kong
Tel: (852) 2824 5000
Fax: (852) 2824 0578
E-mail: wsdinfo@wsd.gov.hk
Website: www.wsd.gov.hk

Works Branch
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2 Tim Mei Avenue, Tamar

Hong Kong
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E-mail: wbenq@devb.gov.hk
Website: www.devb.gov.hk

Trade and Professional Associations

The Hong Kong Construction Association, Limited
3/F, 180-182 Hennessy Road
Wanchai
Hong Kong
Tel: (852) 2572 4414
Fax: (852) 2572 7104
E-mail: admin@hkca.com.hk
Website: www.hkca.com.hk

Hong Kong Construction Industry Employees General Union
2/F Wah Hing Commercial Centre
383 Shanghai Street
Yaumatei, Kowloon
Hong Kong
Tel: (852) 2388 6887
Fax: (852) 2385 5002
E-mail: hkciegu@yahoo.com.hk
Website: www.hkciegu.org.hk

Hong Kong General Chamber of Commerce
22/F United Centre
95 Queensway
Admiralty
Hong Kong
Tel: (852) 2529 9229
Fax: (852) 2527 9843
E-mail: chamber@chamber.org.hk
Website: www.chamber.org.hk

The Hong Kong Institute of Architects
19/F, 1 Hysan Avenue
Causeway Bay
Hong Kong
Tel: (852) 2511 6323
Fax: (852) 2519 6011/(852) 2519 3364
E-mail: info@hkia.net/hkiasec@hkia.org.hk
Website: www.hkia.net

Hong Kong Institute of Construction Managers, Limited
Room 801-2, 8/F, On Lok Yuen Building
25 Des Voeux Road Central
Hong Kong
Tel: (852) 2523 2081
Fax: (852) 2845 4749
E-mail: info@hkicm.org.hk
Website: www.hkicm.org.hk

The Hong Kong Institute of Engineers
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No. 1 Great George Street
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The Hong Kong Institute of Surveyors
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E-mail: info@hkis.org.hk
Website: www.hkis.org.hk

Real Estate Developers Association of Hong Kong
1403, World Wide House
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Chapter 7

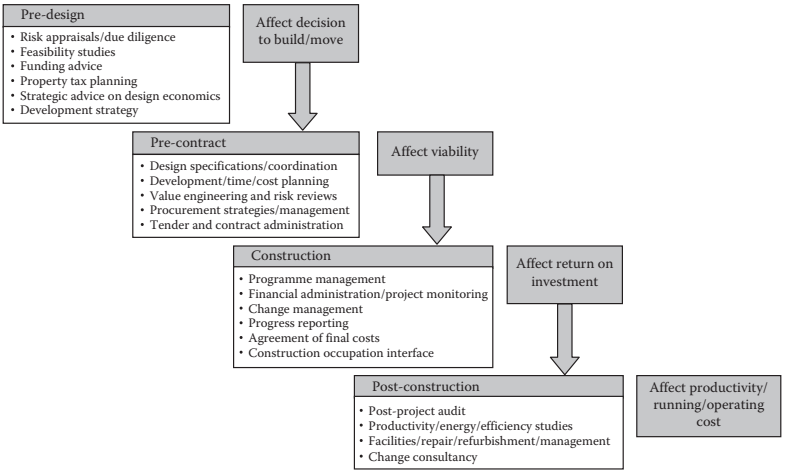
India

LANGDON & SEAH CONSULTING INDIA PVT LTD

Langdon & Seah is recognised as a market leading specialist in Asia, highly experienced in all areas of the built environment, with in-depth knowledge of design, development, procurement and construction delivery processes.

Langdon & Seah offers a multi-disciplinary suite of project management and cost consultancy services, aimed at maximising value for clients.

TYPICAL PROJECT STAGES, INTEGRATED SERVICES AND THEIR EFFECT



INTERNATIONAL EXPERTISE LOCAL DELIVERY

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No. 9, MG Road
Bangalore 560008, India
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CHENNAI OFFICE
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Chennai 600014, India
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Udyog Vihar, Phase-V
Gurgaon, Haryana 122016, India
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HYDERABAD OFFICE
2nd Floor, Trade Fair Office
Hitex Exhibition Centre
Izzat Nagar
Hyderabad 500084, India
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KOLKATA OFFICE
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Sector V,
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Maharashtra, India
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Fax: (91-22) 4125 6050

PUNE OFFICE
City Survey No. 804/B
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(Near Skoda Showroom)
Pune 411004 Maharashtra, India
Tel: (91-20) 2565 0419/0417
Fax: (91-22) 3933 5556

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All data relate to 2013 unless otherwise indicated.

Population	
Population	1,270 mn
Urban population	31%
Population under 15	35%
Population 65 and over	5%
Average annual growth rate	1.58%
Geography	
Land area	3,287,590 km^2
Agricultural area	54.7%
Capital city	New Delhi
Population of Delhi including New Delhi	17.83 mn
Economy	
Monetary unit	Indian rupees (Rs)
Exchange rate (average fourth quarter 2013) to:	
The pound sterling	Rs 99.96
The US dollar	Rs 61.77
The euro	Rs 84.04
The yen × 100	Rs 61.55
Average annual inflation (2003–2013)	7.6%
Inflation rate (last quarter 2013)	8.79%
Gross domestic product	US$1,841.7 billion
GDP per capita	US$1,106.8
Average annual real change in GDP (2013–2014)	4.675%
Private consumption as a proportion of GDP (2007–2008)	–
Public consumption as a proportion of GDP (2007–2008)	–
Investment as a proportion of GDP (2006–2007)	–

THE CONSTRUCTION INDUSTRY

Construction output

The present size of construction industry in terms of annual monetary values is estimated at Rs 248,000 crores (includes Public and Private Investments), equivalent to approximately USD 41.33 billion (1USD = INR 60).

The country's development has been shaped through a series of strategic Five Year Plans, the first of which was drawn up in 1951. The Five Year Plans cover all sectors of economic and social performance and provide the directions and framework for future development and investment. Increasing emphasis has been placed since the first Five Year Plan (1951–1956) on the development of infrastructure, irrigation, energy, transportation and

communications, health, housing, social welfare, rural development and other activities.

The official Five Year Plans do not include the two private sector investment sectors: private household and corporate. While the scale of private corporate investment is most difficult to estimate, it is clear that there has been a lot of activity in this type of work, particularly in the commercial, tourism and residential sectors.

The construction industry is dependent on investments on the infrastructure, industrial and real estate sectors. The Planning Commission has envisaged an outlay of approximately US$1 trillion during the 12th Five Year Plan for infrastructure development in the country. These investments would be achieved through a combination of public and public–private partnerships.

The principal sectors with major construction activities are:

- Housing – particularly private housing
- Corporate – commercial, retail and leisure
- Utilities – water supply, sewage and irrigation, energy (thermo and hydro)
- Transport – roads, railways, ports and airports
- Industrial – new industrial parks

While all sectors have been expanding, considerable investment remains in energy and infrastructure. The country's still rising population and continuing population shift from rural to urban areas and natural disasters have further added to the already existing shortfall in housing. According to the report of the Technical Group on Estimation of Housing Shortage, the estimated shortage was 24.71 million as at 2007 and 18.78 million including backlog during the 12th year plan (2013–2017).

The construction industry continues to show a high growth like previous years due to the high demand in housing and infrastructure. However, it is anticipated that the rate of construction in the private sector will have a downward trend due to the credit resulting from the global economic recession.

Characteristics and structure of the industry

As per year 2013 statistics, the construction industry in India employs about 37 million people where over 85% are serving as workers.

Construction companies are classified under the following categories which are based on contract values:

- Group I – Companies that can bid for contracts over Rs 300 million
- Group II – Companies that can bid for contracts over Rs 100 million
- Group III – Companies that can bid for contracts less than Rs 100 million

The top 10 major contractors in India and their characteristics are given in Table 7.1.

Larson & Toubro Ltd is ranked 48, Punj Lloyd Ltd is ranked 77, Shapoorji Pallonji and Company Ltd is ranked 125 and Ircon International Ltd is ranked at 158 in the *Engineering News Record's 2013 Top 250 International Contractors listing.*

Table 7.1 Major contractors and their characteristics

Major contractors	*Turnover US$ million*	*Main work/types*
Larsen & Toubro Ltd (ECC Group)	10,245 (2012–2013)	Commercial buildings, airports, residential buildings, factories, roads, bridges and metros, ports, hydropower, nuclear construction, minerals and metals
Jaiprakash Industries Ltd	2,252 (2012–2013)	Engineering and construction, cement, power, real estate, expressways, fertiliser, hospitality, healthcare, sports, information technology
Lanco Infratech	254,931 (2012–2013)	Engineering, procurement and construction, power, solar, natural resources, infrastructure
Reliance Infrastructure Limited	2,838 (2012–2013)	Road, metro, airport, real estate, SEZ, energy generation, transmission, distribution, trading, engineering, procurement and construction
GMR Infrastructure	1,663 (2012–2013)	Energy, airports, highways, urban infrastructure
Punj Lloyd	195,290 (2012–2013)	Oil and gas, power, renewables, infrastructure including high-rise, airports, seaports, highways, multi-specialty institutes
IVRCL Limited	627 (2012–2013)	Water and environment, transportation, buildings, power
Hindustan Construction Company Limited	640 (2012–2013)	Hydel power, water solutions, nuclear power and process plants, transportation, real estate
Nagarjuna Construction Company Limited	975 (2012–2013)	Buildings and housing, roads, electrical, water and environment, irrigation, railways, power and metals, oil and gas, mining
Gammon India Limited	866 (2012–2013)	Transportation, power projects, transmission and distribution, structures, irrigation projects, ground engineering and water supply

Source: Construction Week Online.in

One feature of the major Indian contractors is their capability beyond general contracting in infrastructure, heavy industrial and transport projects. This has enabled them to work in several countries such as Iraq, Libya, North Yemen and United Arab Emirates. Between 1975 and 1980, the work undertaken was worth about US$5 billion. Due to political changes, overseas contracts declined to about US$106 million in 1996–1997, from a peak of US$443 million in 1986–1987.

The Indian workforce is categorised as follows:

- Segment I – University qualified managerial and supervisory staff
- Segment II – Workmen with on-site work experience but little or no formal education

In the past, workmen were trained by master craftsmen over a period of time. Recognising the need for more formal structured training, the Government has established several industrial training institutes over the last 20 years and in conjunction with various academic bodies, launched trade training programmes through distant learning.

Design work is mainly undertaken by architects and engineers. There are about 49,463 architects in India who are currently registered with the Council of Architecture as at November 2013. Of this number, 3% are in the public sector, 53% in the private practice and 44% self-employed. The title of architect is protected under the *Architect Act 1972* and to qualify, registration with the Council of Architecture is mandatory.

The number of practising civil engineers is approximately 250,000. There is no uniform system of registration and one can become a civil engineer upon graduation from the university.

The number of quantity surveyors is increasing and presently more than 3,000 are engaged in various roles. The Royal Institution of Chartered Surveyors has initiated the process of regulating the profession and there are a number of chartered surveyors practising, at present, in both public and private organisations.

Clients and finance

The major Government clients (central, state or union territories), which comprise the Indian Railways, Central and State Public Works Department, Indian Army, Indian Oil Ltd, Oil and Natural Gas Commission Ltd, Steel Authority of India Ltd and Gas Authority of India Ltd.

Until very recently, the Government was the predominant client for all major construction projects. With current strategic initiatives being implemented, the private sector market share is increasing year-on-year.

Finance for developers is provided through any registered finance institutions. Loans are commonly in the order of 40% to 70% of the construction

cost, for two to two and a half years, and at rates of interest of about 11% to 20%, depending on market conditions.

For individuals, loans are available for up to 80% of the value of the property with average repayment periods of 8–9 years up to a limit of 20 years at interest rates varying between 8% and 14%.

Selection of design consultants

It is mandatory for public sector clients to select on the basis of fee competition through a public tender.

In the private sector, there is more flexibility when selecting design consultants. A pre-qualification process to identify a list of suitable consultants can be drawn up through a public advertisement or the selection is based on client referrals where the experience, track record and capability of the firm are considered.

Contractual arrangements

The usual procedure for inviting tenders is through public notices seeking an expression of interest from contractors for public projects and for short-listed tenders for private projects.

The traditional method of procurement where the contractor is appointed by the client is still adopted for the majority of projects. For larger contracts or contracts requiring multi-disciplinary expertise, design and build is used and has become increasingly important. The decision to award is made by the client on the basis of price, previous experience, capability, referrals and design proposals.

The following are the commonly adopted Procurement Routes in India:

- BQ Contract/Re-measurement Contract
- Lump Sum Contract
- Design and Build/Turnkey
- Management Contract

And commonly used Contract Forms are:

- FIDIC
- Indian Institute of Architects form
- Central Public Works Department forms
- Municipal bodies form

The industry does not have a standard Form of Contract, although it is estimated that there are some 30 types of Contract Forms in use by various client organisations.

The Construction Industry Development Council, which comprises the Planning Commission and several leading construction organisations, publishes a standard bidding document.

Bills of Quantities are prepared using the Standard Method of Measurement known as IS-1200 which is available from the Bureau of Indian Standards.

Advance payments to the contractor are a norm and usually comprise the following:

- Mobilisation advance, payable as a lump sum upon commencement of the project
- Mobilisation advance for construction plant and equipment, payable as a lump sum upon commencement of the project or when the plant or equipment is delivered to site
- Advance for main construction materials, payable after delivery to site

Repayment of the advance payment is through adjustments made at each interim payment claim.

Liability and insurance

Contractors are required to furnish bank guarantees as Performance Security and Retention Money Guarantee in the order of 5% to 10% of contract sum, respectively. The insurance policies for the projects are generally in three sections such as contractors all risk (CAR), third-party liability and workmen's compensation insurances.

Development control and standards

Master plans, zonal plans and zonal regulations dictate the land use and type of development that can be carried out.

Permits are required before commencement of construction work on site, and upon completion before handover to the client. Some of the authorities involved include the Municipal, Urban Art Commission, Fire Department, Aviation Department, Ministry of Environmental and Forest and Services Department.

CONSTRUCTION COST DATA

Cost of labour

The figures that follow are typical of labour costs in the Bangalore area as at the fourth quarter of 2013.

	Wage rate (per day) Rs	*Cost of labour (per day) Rs*	*Number of hours worked per year*
Site operatives			
Bricklayer	450	575	2,520–2,560
Shuttering carpenter	450	575	2,520–2,560
Plumber	450	575	2,520–2,560
Electrician	450	575	2,520–2,560
Structural steel erector	450	575	2,520–2,560
Welder	450	575	2,520–2,560
Labourer	250	325	2,520–2,560
Equipment operator	300	385	2,520–2,560
Hoist operator	375	500	2,520–2,560
JCB operator	375	500	2,520–2,560
Site supervision	*(per month)*	*(per month)*	
General foreman	18,000	27,000	2,400
Trades foreman	18,000	27,000	2,400
Clerk of works	15,000	22,500	2,400
Resident engineer	100,000	150,000	2,400
Contractors' personnel			
Site manager	100,000	150,000	2,400
Site engineer	40,000	60,000	2,400
Site quantity surveyor	45,000	67,500	2,400
Consultants' personnel			
Senior architect	100,000	150,000	2,400
Senior engineer	60,000	90,000	2,400
Senior surveyor	65,000	97,500	2,400
Qualified architect	40,000	60,000	2,400
Qualified engineer	40,000	60,000	2,400
Qualified surveyor	40,000	60,000	2,400

Cost of materials

The figures that follow are indicates the costs of main construction materials, delivered to site in the Bangalore area, as incurred by contractors in the fourth quarter of 2013. These assume that the materials would be in quantities as required for a medium-sized construction project and that the location of the works would be neither constrained nor remote.

All the costs in this section exclude duties and value-added tax (VAT).

	Unit	*Cost Rs*
Cement and aggregate		
Ordinary Portland cement in 50 kg bags	bag	290
Coarse aggregates for concrete	tonne	675
Sharp sand for concrete	tonne	840
Ready mixed concrete (Grade 30)	m^3	4,500
Ready mixed concrete (Grade 20)	m^3	4,300
Steel		
Mild steel reinforcement	tonne	45,500
High tensile steel reinforcement	tonne	48,000
Structural steel sections	tonne	50,000
Bricks and blocks		
Common bricks (215 × 102.5 × 65 mm)	1,000	6,000
Good quality facing bricks (215 × 102.5 × 65 mm)	1,000	6,500
Hollow concrete blocks (390 × 190 × 100 mm)	100	3,200
Timber and insulation		
Hardwood for joinery	m^3	30,000
Exterior quality plywood (12 mm)	m^2	600
50 mm thick quilt insulation (16 kg/m^3)	m^2	450
Hardwood internal door complete with frame and ironmongery	m^2	6,500
Glass and ceramics		
Float glass (10 mm)	m^2	700
Plaster and paint		
Good quality ceramic wall tiles (6 mm)	m^2	350
Plasterboard (13 mm thick) – gypsum	m^2	250
Emulsion paint in 5 litre tins	litre	170
Gloss oil paint in 5 litre tins	litre	1,000
Tiles and paviors		
Clay floor tiles (100 × 200 × 8 mm)	m^2	220
Vinyl floor tiles (300 × 300 × 2 mm)	m^2	450
Clay roof tiles	1,000	14,000
Precast concrete roof tiles	1,000	25,000
Drainage		
WC suite complete	each	6,000
Lavatory basin complete	each	2,500
100 mm diameter clay drain pipes	m	350
150 mm diameter cast iron drain pipes (medium grade)	m	1,200

Unit rates

The descriptions that follow are generally shortened versions of standard descriptions listed in full in Chapter 19 as at the fourth quarter of 2013. Where an item has a two-digit reference number (e.g. 05 or 33), this relates to the full description against that number in Chapter 19. Where an item has an alphabetic suffix (e.g. 12A or 34B) this indicates that the standard description has been modified. Where a modification is major the complete modified description is included here and the standard description should be ignored. Where a modification is minor (e.g. the insertion of a named hardwood) the shortened description has been modified here but, in general, the full description in Chapter 19 prevails.

		Unit	*Rate Rs*
Excavation			
01	Mechanical excavation of foundation trenches	m^3	300
02	Hardcore filling making up levels	m^3	160
Concrete work			
04	Plain *in situ* concrete in strip foundations in trenches – Grade 20	m^3	5,500
05	Reinforced *in situ* concrete in beds – Grade 20	m^3	5,400
06	Reinforced *in situ* concrete in walls – Grade 20	m^3	5,450
07	Reinforced *in situ* concrete in suspended floors or roof slabs – Grade 30	m^3	5,800
08	Reinforced *in situ* concrete in columns – Grade 30	m^3	5,600
09	Reinforced *in situ* concrete in isolated beams – Grade 30	m^3	5,600
Formwork			
11A	Waterproof plywood formwork to concrete walls	m^2	550
12A	Waterproof steel formwork to concrete isolated columns	m^2	550
12B	Waterproof plywood formwork to concrete columns	m^2	550
13A	Waterproof plywood formwork to horizontal soffits of slabs	m^2	600
Reinforcement			
14	Reinforcement in concrete walls	tonne	60,000
15A	Reinforcement in suspended concrete slabs	tonne	60,000
16	Fabric reinforcement in concrete beds	m^2	1,200
Steelwork			
17	Fabricate, supply and erect steel-framed structure	tonne	95,000
18	Framed structural steelwork in universal joist sections	tonne	95,000
19A	Structural steelwork lattice roof trusses	tonne	95,000

Continued

		Unit	*Rate Rs*
Roofing			
24	Concrete interlocking roof tiles 430 × 380 mm	m^2	450
25	Plain clay roof tiles 260 × 160 mm	m^2	320
29A	Three layers polyester-based bitumen felt roof covering	m^2	250
33	Troughed galvanised steel roof cladding	m^2	850
Woodwork and metalwork			
34	Preservative-treated sawn softwood 50 × 100 mm	m	210
35	Preservative-treated sawn softwood 50 × 150 mm	m	310
37A	Two-panel glazed door in kapur hardwood size 850 × 2000 mm	each	15,000
38A	Solid core half hour fire-resisting hardwood	each	25,000
40A	Aluminium double-glazed door, size 1200 × 2100 mm	each	12,500
41A	Hardwood skirtings	m	260
Plumbing			
42A	UPVC half-round caves gutter (100 mm diameter)	m	275
43A	UPVC rainwater pipes (100 mm diameter)	m	330
44	Light gauge copper cold water tubing	m	450
45A	High-pressure plastic pipes for cold water supply (100 mm diameter)	m	800
47	UPVC soil and vent pipes	m	380
48	White vitreous China WC suite	each	3,500
49A	White vitreous wash hand basin	each	2,000
51	Stainless-steel single bowl sink and double drainer	each	12,500
Electrical work			
52A	PVC insulated and PVC sheathed (4 mm^2 copper wire)	m	50
53	13 amp unswitched socket outlet	each	125
54A	Flush-mounted 20 amp, MCB control	each	325
Finishings			
55A	Two coats cement and sand (1:4) plaster on brick walls	m^2	340
56	White glazed tiles on plaster walls	m^2	750
57	Red clay quarry tiles on concrete floors	m^2	450
58	Cement and sand screed to concrete floors	m^2	350
59	Thermoplastic floor tiles on screed	m^2	580
60	Mineral fibre tiles on concealed suspension	m^2	800
Painting			
62	Emulsion on plaster walls	m^2	130
63	Oil paint on timber	m^2	105

Approximate estimating

The building costs per unit area that follow are averages incurred by building clients for typical buildings in Bangalore as at the fourth quarter of 2013. They are based upon the total floor area of all storeys, measured between external walls and without deduction for internal walls.

Approximate estimating costs generally include mechanical and electrical installations but exclude furniture, loose or special equipment, and external works; they also exclude fees for professional services. The costs shown are for specifications and standards appropriate to Bangalore and this should be borne in mind when attempting comparisons with similarly described building types in other countries. A discussion of this issue is included in Chapter 2. Comparative data for countries covered in this publication, including construction cost data, are presented in Part III.

Approximate estimating costs must be treated with caution; they cannot provide more than a rough guide to the probable cost of building. All the rates in this section exclude sales tax.

	Cost m^2 *Rs*	*Cost* ft^2 *Rs*
Industrial buildings		
Factories for letting – reinforced concrete	15,050	1,400
Factories for owner occupation (light industrial use) – reinforced concrete	18,840	1,750
Factories for owner occupation (heavy industrial use) – reinforced concrete	20,990	1,950
Factory/office (high tech) for letting (shell and core only) – reinforced concrete	9,150	850
Factory/office (high tech) for letting (shell and core only)	7,000	650
Factory/office (high tech) for owner occupation (controlled environment, fully finished)	47,900	4,450
High tech laboratory (air-conditioned)	48,980	4,550
Warehouses, low bay (6–8 m high) for letting	13,730	1,280
Warehouses, low bay for owner occupation	15,070	1,400
Warehouses, high bay for owner occupation (including heating)	17,230	1,600
Administrative and commercial buildings (Warm Shell)		
Offices for letting, 5–10 storeys, non-air-conditioned	20,850	1,940
Offices for letting, 5–10 storeys, air-conditioned	24,600	2,290
Offices for letting, high rise, air-conditioned	25,730	2,390
Prestige/headquarters office, 5–10 storeys, air-conditioned	29,120	2,710
Prestige/headquarters office, high rise, air-conditioned	30,250	2,810

Continued

	Cost m² Rs	*Cost ft² Rs*
Health and education buildings (Warm Shell)		
General hospitals (100 beds)	36,220	3,360
Private hospitals	38,220	3,550
Health centres	36,220	3,360
Primary/junior schools	14,170	1,310
Secondary/middle schools	15,750	1,460
University	17,490	1,620
Recreation and arts buildings (Warm Shell)		
Theatres (<500 seats)	18,900	1,760
Sports halls including changing and social facilities	16,690	1,550
Swimming pools (international standard) (Olympic size)	14,500	1,350
Swimming pools (schools standard) including changing facilities	15,500	1,440
City centre/central libraries	14,150	1,310
Branch/local libraries	14,150	1,310
Residential buildings		
Private/mass market single family housing two-storey detached/ semi-detached (multiple units)	17,990	1,670
Purpose-designed single family housing two-storey detached (single unit)	18,500	1,720
Social/economic apartment housing, high rise with lifts and 5–10 storey	17,990	1,670
Private sector apartment building (standard specification)	20,990	1,950
Private sector apartment buildings (luxury)	25,840	2,400
Student/nurses halls of residence – without lifts	15,610	1,450
Homes for the elderly (shared accommodation) – without lifts	15,610	1,450
Hotel, 5 star, city centre	66,150	6,150
Hotel, 3 star, city/provincial	46,830	4,350

Regional variations

The approximate estimating costs are based on average rates in Bangalore. Adjust these costs by the following factors for regional variations:

Delhi	:	+5%
Mumbai	:	+6%
Chennai (formerly Madras)	:	–1%
Kolkata	:	–2%

Figure 7.1 The Indian rupee against sterling, euro, US dollar and 100 Japanese yen.

Value-added tax and service tax

The standard rates of VAT are currently 0%, 5.5% and 14.5%, chargeable on the material component when computed on the regular scheme. Where VAT is calculated on the composite scheme the rate should not exceed 4% of the total contract sum. Service Tax is 12.36% of the labour component and where this is not identified can be applied at 4.944% of the total contract sum.

EXCHANGE RATES

Figure 7.1 shows the movement of Indian rupee against the sterling pound, the euro, the US dollar and 100 Japanese yen since 2003. The values used in the figure are quarterly and the method of calculating these is described and general guidance on the interpretation of the figure are provided in Chapter 2. The average exchange rate in the fourth quarter of 2013 was Rs 99.96 to pound sterling, Rs 84.04 to euro, Rs 61.77 to US dollar and Rs 61.55 to 100 Japanese yen.

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Ministry of Statistics and Programme Implementation
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Chapter 8

Indonesia

LANGDON & SEAH INDONESIA PT.

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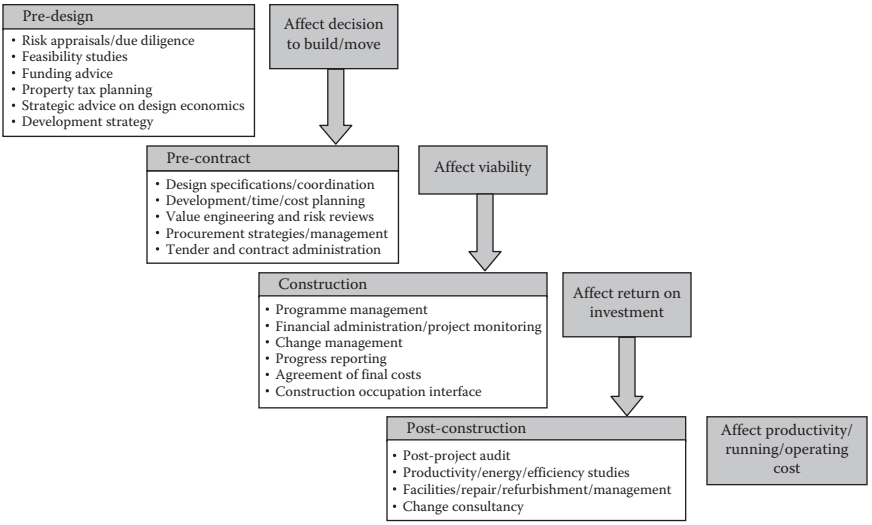
TYPICAL PROJECT STAGES, INTEGRATED SERVICES AND THEIR EFFECT



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All data relate to 2013 unless otherwise indicated.*

Population	
Population	251.2 mn
Urban population	50.7%
Population under 15	26.6%
Population 65 and over	6.4%
Average annual growth rate (2010–2013)	1.87%
Geography	
Land area	1,890,754 km^2
Agricultural area (2011)	30.1%
Capital city	Jakarta
Population of capital city	9.77 mn
Economy	
Monetary unit	Indonesia rupiah (Rp)
Exchange rate (average fourth quarter of 2013) to:	
The pound sterling	Rp 18,732
The US dollar	Rp 11,573
The euro	Rp 15,749
The yen × 100	Rp 11,525
Average annual inflation (2004–2013)	7.26%
Inflation rate	8.38%
Gross domestic product (GDP) (2012)	Rp 8,439,731 bn
GDP per capita (2012)	Rp 34,182,791
Average annual real change in GDP (2000–2013)	5.43%
Private consumption as a proportion of GDP (2012)	57.0%
Public consumption as a proportion of GDP (2012)	9.0%
Investment as a proportion of GDP (2012)	33.2%
Construction	
Gross value of construction output (2011)	Rp 754,484 bn
Net value of construction output (2011)	Rp 370,418 bn
Net value of construction output as a proportion of GDP (2011)	5.01%

THE CONSTRUCTION INDUSTRY

Construction output

The gross value of construction output in 2011 was Rp 754,484 billion, equivalent to US$86.48 billion or 10.21% of GDP. The net value of construction output in 2011 was Rp 370,418 billion, equivalent to US$42.46 billion or 5.01% of GDP.

* Preliminary figure.

Table 8.1 Value of construction completed by type of work, 2012

Type of work	*% of total*
Building	28
Civil engineering	56
Specialised construction	16
Total	100

Source: Government statistics.

Table 8.1 shows the value of construction by type of the work completed by contractors who are members and non-members of the Indonesian Contractors Association (ICA).

Civil construction has been the predominant type of activity for the past 5 years.

Most of the construction activity (25%) is centred in the capital city, Jakarta, which is home to 4% of the national population. West Java, Central Java and East Java, on the other hand, have construction outputs which are significantly lower than their respective share of the national population (Table 8.2).

Characteristics and structure of the industry

The construction industry has been very active for the past 4 years with 8% growth in 2011, 10% growth in 2012 and 12% growth in 2013. It is anticipated that growth will slow down in 2014 which is an election year.

Contractors are classified under three major groups and as of 2012, the total number registered with the National Contractors Association of Indonesia or *Gabungan Pelaksana Konstruksi Nasional Indonesia* (GAPENSI) are provided in Table 8.3.

The major contractors in Indonesia are as follows:

- PT Acset Indonusa
- PT. Adhi Karya (Persero)
- PT. Balfour Beaty Sakti Indonesia
- PT. BAM Decorient Indonesia
- PT. Hutama Karya (Persero)
- PT Jaya Konstruksi
- PT. Murinda Iron Steel
- PT Nusa Raya Cipta
- PT. Pembangunan Perumahaan (Persero)
- PT. Murinda Iron Steel
- PT Tatamulia Nusantara Indah

Table 8.2 Construction output and population by regions, 2012

Province	*Proportion of population*	*Proportion of construction output*	*Rank by population*	*Rank by construction output*
Nanggroe Aceh Darussalam	1.89	2.15	14	10
North Sumatera	5.46	4.02	4	5
West Sumatera	2.04	1.99	11	12
Riau	2.33	3.87	10	6
Jambi	1.30	0.82	20	21
South Sumatera	3.14	2.29	9	8
Bengkulu	0.72	0.31	26	31
Lampung	3.20	0.98	8	19
Bangka Belitung	0.51	0.49	29	28
Riau Island[a]	0.71	1.67	27	13
DKI Jakarta	4.04	25.46	6	1
West Java	18.12	11.44	1	3
Central Java	13.63	10.50	3	4
D.I. Yogyakarta	1.45	1.22	19	16
East Java	15.77	13.78	2	2
Banten	4.47	2.28	5	9
Bali	1.64	1.11	16	17
West Nusa Tenggara	1.89	0.97	13	20
East Nusa Tenggara	1.97	0.65	12	26
West Kalimantan	1.85	1.07	15	18
Central Kalimantan	0.93	0.75	25	23
South Kalimantan	1.53	1.34	17	15
East Kalimantan	1.50	3.03	18	7
North Sulawesi	0.96	0.80	23	22
Central Sulawesi	1.11	0.68	22	25
South Sulawesi	3.38	2.10	7	11
South East Sulawesi	0.94	0.69	24	24
West Sulawesi	0.49	0.23	30	33
Gorontalo[a]	0.44	0.44	31	29
Maluku	0.65	0.42	28	30
North Maluku	0.44	0.29	32	32
Papua	1.19	1.51	21	14
West Papua[a]	0.32	0.64	33	27
Total	100	100	–	–

Source: Statistics Indonesia of The Republic of Indonesia.

[a] New province after year 2000.

Table 8.3 Number of registered contractors by qualification class, 2012

Qualification	*Eligibility*	*Number of registered contractors*	*% of total*
B1–B2 – Large	Bidding for work above Rp 3 billion	2,439	2
M – Medium	Bidding for work Rp 1–3 billion	17,993	14
K1–K3 – Small	Bidding for work below Rp 1 billion	110,183	84
Total		130,615	100

Source: Gabungan Pelaksana Konstruksi Nasional Indonesia.

- PT. Total Bangun Persada
- PT Waskita Karya

Clients and finance

The client for public works is generally the Government (central and regional), although private companies are now able to become involved to a significant extent in funding, constructing and operating public works such as toll roads and electricity generation plants.

The Government obtains finance from various external sources as well as the national development budget, the Asian Development Bank, the World Bank and other multilateral and bilateral aid agencies. Private sector financing is obtained through local and foreign financial institutions including state and private banks, pension funds and private investors.

Selection of design consultants

For Government projects, there must be a single-stage open tender for consultancy work with pre-qualification for specialist projects.

Private sector procurement is not regulated by law and the procedure is therefore more flexible. With selective tendering, normal design is mostly outsourced.

Fees are generally negotiated. There are no recommended or mandatory published fee scales.

Contractual arrangements

Construction in the Government sector is restricted to Government-owned contractors (BUMN) except for large specialist projects. On the other hand, private sectors, BUMN contractors, private contractors and foreign joint operation contractors are allowed to participate.

The process for selection of design consultants applies also to the process for selection of contractors and subcontractors.

In the public sector, the tender is usually called on a lump sum basis by way of traditional 'construction-only' contracting. Private sector procurement is also largely traditional but also involves a variety of other methods. Traditional bills of quantities are normal. Other procurement methods such as:

- Turnkey
- Contractor financed
- Design and build

are also used but are generally restricted to relatively small number of projects.

Private contracts are usually based on internationally recognised forms adapted to suit the Indonesian conditions and statutes (typically FIDIC). Bank guarantees are normally required and cash retention is usually preferred to bonds. Advance payments are usually made. Variations are authorised through contract instructions and change orders with consequent adjustment in the contract sum.

Government contracts are based on official custom-written departmental contracts.

Liability and insurance

Insurance is compulsory for all parties. A Contractors' All Risks Policy covering the works and third-party liability is normally taken out by the owner or the contractor in joint names for the full contract value and is valid until taking over of the project. By law, contractors must insure their workers with the preference being the Government-owned scheme. Insurance companies are common in Indonesia but risks are normally reinsured offshore. Insurance claims are usually settled amicably.

Development control and standards

The Directorate of Regional and City Planning provides general development guidance and the regional Government ensures implementation by the land user. If all other requirements are fulfilled, full or partial building permission takes about 3 months. The process is more stringent in Jakarta than elsewhere.

At the planning stage, architectural, structural and building services review is carried out by the appropriate authority to check that the design is in compliance with laws, rules and standards.

Seismic structural codes must be applied throughout Indonesia.

Before buildings can obtain an *occupation permit*, approval from the fire authority must be obtained.

The national standard for building materials/products is *Standard Industrial Indonesia (SII) – Indonesian Standard for Industry*. Foreign standards such as ASTM, BS, DIN, PSB and JIS are also applied extensively.

CONSTRUCTION COST DATA

Cost of labour

The figures that follow are typical of labour costs in the Jakarta area as at the fourth quarter of 2013. The wage rate is the basis of an employee's income, while the cost of labour indicates the cost to a contractor of employing that employee. The difference between the two covers a variety of mandatory and voluntary contributions – a list of items which could be included is given in Chapter 2.

	Wage rate (per hour) Rp	*Cost of labour (per day) Rp*	*Number of hours worked per year*
Site operatives			
Mason/bricklayer	13,000	130,000	2,208
Carpenter	15,000	150,000	2,208
Plumber	15,000	150,000	2,208
Electrician	15,000	150,000	2,208
Structural steel erector	14,000	140,000	2,208
HVAC installer	14,000	140,000	2,208
Semi-skilled worker	12,000	120,000	2,208
Unskilled labourer	10,000	100,000	2,208
Equipment operator	19,000	190,000	2,208
Watchman/security	10,000	100,000	2,208
Site supervision			
General foreman	20,000	200,000	2,208
Trades foreman	20,000	200,000	2,208

Cost of materials

The figures that follow are the costs of main construction materials, delivered to site in the Jakarta area, as incurred by contractors in the fourth quarter of 2013. These assume that the materials would be in quantities as required for a medium-sized construction project and that the location of the works would be neither constrained nor remote.

All the costs in this section exclude value-added tax (VAT).

	Unit	*Cost Rp*
Cement and aggregate		
Ordinary Portland cement in 40 kg bags	tonne	1,600,000
Coarse aggregates for concrete	m^3	320,000
Fine aggregates for concrete	m^3	320,000
Ready mixed concrete (K-350) slump 10	m^3	1,050,000
Ready mixed concrete (K-225) slump 12	m^3	900,000
Steel		
Mild steel reinforcement	tonne	9,000,000
High tensile steel reinforcement	tonne	9,000,000
Structural steel sections	tonne	16,000,000
Bricks and blocks		
Common bricks (220 × 100 × 50 mm)	1,000	800,000
Light weight concrete blocks (590 × 190 × 100 mm)	1,000	12,000,000
Precast concrete cladding units with exposed aggregate finish	m^2	850,000
Timber and insulation		
Softwood sections for carpentry	m^3	2,850,000
Softwood for joinery (Kamper)	m^3	11,000,000
Hardwood for joinery (Teak)	m^3	30,000,000
Plywood for interior joinery (18 mm) 1200 × 2400 mm	pc	350,000
100 mm thick quilt insulation rockwool, density 80 kg/m^2	m^2	280,000
100 mm thick rigid slab insulation	m^2	120,000
Hardwood internal door complete with frames and ironmongery	each	5,000,000
Glass and ceramics		
Float glass (8 mm)	m^2	190,000
Good quality ceramic wall tiles (200 × 100 mm)	m^2	100,000
Plaster and paint		
Plasterboard (12 mm thick) 1200 × 2400 mm	pc	100,000
Emulsion paint in 25 kg tins	kg	45,000
Gloss oil paint in 20 kg tins	kg	100,000
Tiles and paviors		
Ceramic floor tiles (150 × 150 × 10 mm)	m^2	220,000
Vinyl floor sheet	m^2	200,000
Precast concrete paving block (100 × 200 × 80 mm)	m^2	70,000
Clay roof tiles	1,000	8,000,000
Precast concrete roof tiles (size 425 × 330 mm)	1,000	8,500,000

Continued

	Unit	Cost Rp
Drainage		
WC suite complete	each	3,500,000
Lavatory basin complete	each	1,500,000
100 mm diameter UPVC drain pipes	m	130,000

Unit rates

The descriptions that follow are generally shortened versions of standard descriptions listed in full in Chapter 19. Where an item has a two-digit reference number (e.g. 05 or 33), this relates to the full description against that number in Chapter 19. Where an item has an alphabetic suffix (e.g. 12A or 34B) this indicates that the standard description has been modified. Where a modification is major the complete modified description is included here and the standard description should be ignored; where a modification is minor (e.g. the insertion of a named hardwood) the shortened description has been modified here but, in general, the full description in Chapter 19 prevails.

The unit rates that follow are for main work items on a typical construction project in the Jakarta area in the fourth quarter of 2013. The rates include all necessary labour, materials and equipment. Allowances have been included to cover contractors' overheads and profit and preliminary and general items.

All the rates in this section exclude VAT.

		Unit	Rate Rp
Excavation			
01	Mechanical excavation of foundation trenches	m^3	40,000
02	Hardcore filling making up levels	m^3	330,000
Concrete work			
04	Plain *in situ* concrete in strip foundations in trenches	m^3	900,000
05	Reinforced *in situ* concrete in beds	m^3	1,050,000
06	Reinforced *in situ* concrete in walls	m^3	1,250,000
07	Reinforced *in situ* concrete in suspended floors or roof slabs	m^3	1,150,000
08	Reinforced *in situ* concrete in columns	m^3	1,250,000
09	Reinforced *in situ* concrete in isolated beams	m^3	1,200,000
10	Precast concrete slabs	m^3	2,000,000
Formwork			
11	Softwood formwork to concrete walls	m^2	150,000
12	Softwood formwork to concrete columns	m^2	150,000
13	Softwood formwork to horizontal soffits of slabs	m^2	150,000

Continued

		Unit	*Rate Rp*
Reinforcement			
14	Reinforcement in concrete walls	tonne	12,000,000
15	Reinforcement in suspended concrete slabs	tonne	12,000,000
16	Fabric reinforcement in concrete beds	m^2	60,000
Steelwork			
17	Fabricate, supply and erect steel framed structure	tonne	25,000,000
18	Framed structural steelwork in universal joist sections	tonne	25,000,000
19	Structural steelwork lattice roof trusses	tonne	28,000,000
Brickwork and blockwork			
21A	Solid (lightweight) concrete blocks	m^2	240,000
Roofing			
24A	Concrete interlocking roof tiles 350 × 225 mm	m^2	120,000
25	Plain clay roof tiles 260 × 160 mm	m^2	100,000
33	Troughed galvanised steel roof cladding	m^2	220,000
Woodwork and metalwork			
34	Preservative-treated sawn softwood 50 × 100 mm	m	60,000
35	Preservative-treated sawn softwood 50 × 150 mm	m	90,000
36A	Single glazed casement window in Kamper hardwood, size 650 × 900 mm	each	1,000,000
37A	Two-panel glazed door in Kamper hardwood, size 850 × 900 mm	each	2,750,000
38	Solid core half hour fire resisting hardwood internal flush door, size 800 × 2000 mm	each	4,500,000
39	Aluminium double-glazed window, size 1200 × 1200 mm	each	3,000,000
40	Aluminium double-glazed door, size 850 × 2100 mm	each	4,500,000
41	Hardwood skirtings	m	100,000
Plumbing			
42A	150 mm diameter UPVC half round eaves gutter	m	250,000
43A	150 mm diameter UPVC rainwater pipes	m	200,000
44	Light gauge copper cold water tubing	m	N/A
46A	50 mm diameter low-pressure plastic pipes for cold water distribution	m	40,000
47A	150 mm diameter UPVC soil and vent pipes	m	200,000
48	White vitreous China WC suite	each	3,700,000
49	White vitreous China lavatory basin	each	1,700,000
50	Glazed fireclay shower tray	each	N/A
51	Stainless steel single bowl sink and double drainer	each	4,000,000

Continued

		Unit	Rate Rp
Electrical work			
52A	PVC insulated and copper-sheathed cable NYA 3 × 1C 5.5 mm²	m	10,000
53	13 amp unswitched socket outlet	each	80,000
54	Flush-mounted 20 amp, 1-way light switch	each	60,000
Finishings			
56	White-glazed tiles on plaster walls	m²	160,000
58	Cement and sand screed to concrete floors	m²	60,000
60A	Mineral fibre tiles on concealed suspension system, 600 × 600 mm	m²	180,000
Glazing			
61A	5 mm glazing to wood	m²	100,000
Painting			
62	Emulsion on plaster walls	m²	20,000
63	Oil paint on timber	m²	35,000

Approximate estimating

The building costs per unit area that follow are expressed in US$ and are averages incurred by building clients for typical buildings in the Jakarta area as at the fourth quarter of 2013. They are based upon the total floor area of all storeys, measured between external walls and without deduction for internal walls.

Approximate estimating costs generally include mechanical and electrical installations but exclude furniture, loose or special equipment and external works; they also exclude fees for professional services. The costs shown are for specifications and standards appropriate to Indonesia and this should be borne in mind when attempting comparisons with similarly described building types in other countries. A discussion of this issue is included in Chapter 2. Comparative data for countries covered in this publication, including construction cost data, are presented in Part III.

Approximate estimating costs must be treated with caution; they cannot provide more than a rough guide to the probable cost of building.

All the rates in this section exclude VAT.

	Cost m² US$	Cost ft² US$
Industrial buildings		
Factories for letting	300	39
Factories for owner occupation (light industrial use)	335	31

Continued

	Cost m² US$	*Cost ft² US$*
Factories for owner occupation (heavy industrial use)	420	39
Factory/office (high tech) for letting (shell and core only)	310	29
Factory/office (high tech) for letting (ground floor shell, first floor offices)	400	37
Factory/office (high tech) for owner occupation (controlled environment, fully finished)	560	52
High tech laboratory workshop centres (air-conditioned)	600	56
Warehouses, low bay (6–8 m high) for letting (no air-conditioned)	270	25
Warehouses, low bay for owner occupation (including air-conditioned)	400	37
Warehouses, high bay for owner occupation (10 mm) (excluding air-conditioned)	480	45
Cold stores/refrigerated stores	700	65
Administrative and commercial buildings		
Civic offices, non-air-conditioned	440	41
Civic offices, fully air-conditioned	510	47
Offices for letting, 5–10 storeys, air-conditioned	550	51
Offices for letting, high rise, air-conditioned	670	62
Offices for owner occupation high rise, air-conditioned	650	60
Prestige/headquarters office, 5–10 storeys, air-conditioned	750	70
Prestige/headquarters office, high rise, air-conditioned	1,000	93
Residential buildings		
Purpose designed single family housing two-storey detached (single unit)	950	88
Social/economic apartment housing, low rise (no lifts)	450	42
Social/economic apartment housing, high rise (with lifts)	520	48
Private sector apartment building (standard specification)	850	79
Private sector apartment buildings (luxury)	1,100	102
Hotel, 5 star, city centre (excl FF&E & HOE)	1,700	158
Hotel, 3 star, city/provincial (excl FF&E & HOE)	1,500	139
Golf courses	500,000	per hole
Golf clubhouse (excl FF&E and HOE)	1,200	111
Health and education buildings		
General hospitals	850	79
Private hospitals	900	84
Health centres	750	70
Primary/junior schools	450	42
Secondary/middle schools	600	56
University	650	60

Regional variations

The approximate estimating costs are based on projects in Jakarta. Costs, elsewhere, can vary by up to ±20%.

Value-added tax

The standard rate of VAT is currently 10%, chargeable on general building work.

EXCHANGE RATES

Figure 8.1 plots the movement of the Indonesian rupiah against the sterling, the euro, the US dollar and 100 Japanese yen since 2003. The values used in the figure are quarterly and the method of calculating these is described and general guidance on the interpretation of the figure are provided in Chapter 2. The average exchange rate for the fourth quarter of 2013 was Rp 18,732 to pound sterling, Rp 15,749 to euro, Rp 11,573 to US dollar and Rp 11,525 to 100 Japanese yen.

Figure 8.1 The Indonesian rupiah against sterling, euro, US dollar and 100 Japanese yen.

USEFUL ADDRESSES

Public Organisations

Agency of Assessment and Application of Technology
Badan Pengkajian dan Penerapan Teknologi (BPPT)
Jalan M.H. Thamrin 8
Jakarta 10340
Tel: (+62-21) 316-8200
Fax: (+62-21) 390-4573
E-mail: humas@bppt.go.id
Website: http://kip.bppt.go.id

Indonesian Institute of Science
Lembaga Ilmu Pengetahuan Indonesia (LIPI)
Sasana Widya Sarwono
Jalan Jendral Gatot Subroto 10
Jakarta 12710
Tel: (+62-21) 522-5641
Fax: (+62-21) 520-7226/520-7120
E-mail: kepala@lipi.ri.gi.ig
Website: www.lipi.go.id

The Investment Coordinating Board
Badan Koordinasi Penanaman Modal (BKPM)
Jalan Jendral Gatot Subroto 44
Jakarta 12190
PO Box 3186
Tel: (+62-21) 525-2008
Fax: (+62-21) 520-2050/525-4945
E-mail: infobkpm@yahoo.com
Website: www.bkpm.go.id

Ministry of Energy and Mineral Resources
Kementerian Energi dan Sumber Daya Mineral
Jalan Medan Merdeka Selatan No. 18
Jakarta 10110
Tel: (+62-21) 380-4242
Fax: (+62-21) 344-0649
E-mail: puskom@esdm.go.id
Website: www.esdm.go.id

Ministry of Industry
Kementerian Perindustrian

Jalan Jendral Gatot Subroto Kav. 52-53
Jakarta 12950
Tel: (+62-21) 525-5509 ext. 2666
E-mail: pusdatin@kemenperin.go.id
Website: www.kemenperin.go.id

Ministry of Public Works
Kementerian Pekerjaan Umum
Jalan Pattimura 20
Kebayoran Baru
Jakarta 12110
Tel: (+62-21) 739-2262
Fax: (+62-21) 722-0219
E-mail: punet@pu.go.id
Website: www.pu.go.id

The Ministry of Public Works is subdivided into:
Direktorat Bina Marga
A directorate covering roads and bridges and construction work
Jalan Pattimura No. 20
Kebayoran Baru, Jakarta Selatan
Website: www.binamarga.pu.go.id

Direktorat Cipta Karya
A directorate covering general building works
E-mail: dirjenck@pu.go.id
Website: www.ciptakarya.pu.go.id

Direktorat Penataan Ruang
A directorate covering hydrologic construction works
E-mail: dirppruwilnas_taru@pu.go.id
Website: www.penataanruang.net.id

Direktorat Sumber Daya Air
A directorate covering sanitation works
E-mail: dirbiprog_sda@pu.go.id
Website: www.sda.pu.go.id

Ministry of Tourism and Creative Economy
Kementerian Pariwisata dan Ekonomi Kreatif
Sapta Pesona Building
Jalan Medan Merdeka Barat 17
Jakarta 10110

Tel: (+62-21) 383-8250
Fax: (+62-21) 386-7600
E-mail: pustadin@budpar.go.id
Website: www.parekraf.go.id

National Development Planning Agency
Badan Perencanaan Pembangunan Nasional (BAPPENAS)
Jalan Taman Suropati 2
Jakarta 10310
Tel: (+62-21) 3193-6207
Fax: (+62-21) 314-5374
Website: www.bappenas.go.id

Regional Goverment Construction Ministries:
Kantor Wilayah Pekerjaan Umum
Public Works; Ministry Regional Offices under coordination of Central Government
Dinas Pekerjaan Umum
Public Works Provincial Offices under coordination of Regional Government
Jalan Pattimura 20
Kebayoran Baru, Jakarta Selatan
Tel: (+62-21) 7274-7564/7268-673
Fax: (+62-21) 7200-793
Website: www.pu.go.id

Science and Technology Research Centre
Pusat Penelitian Ilmu Pengetahuan dan Teknologi (PUSPITEK)
Jalan Raya Puspiptek, serpong
Kota Tangerang Selatan
Banten
Tel: (+62-21) 756-0562
Fax: (+62-21) 756-0191/756-0051
E-mail: humaspuspiptek@ristek.go.id
Website: http://puspiptek.ristek.go.id

State Ministry of Public Housing
Kementerian Perumahan Rakyat
Jalan Raden Patah 1 No. 1, Level 2, Wing 4, Kebayoran Baru
Jakarta Selatan
Tel: (+62-21) 739-7727
Fax: (+62-21) 739-7727
E-mail: m_yusuf@kemenpera.go.id
Website: www.kemenpera.go.id

Statistics Indonesia of The Republic of Indonesia
Badan Pusat Statistik
Jalan Dr Sutomo 6-8
Jakarta 10710
Tel: (+62-21) 384-1195/384-2508/381-0291
Fax: (+62-21) 385-7046
E-mail: bpshq@bps.go.id
Website: www.bps.go.id

Trade and Professional Associations

Batam Industrial Development Authority
Otorita Pengembangan Daerah Industri Pulau Batam
BIDA Building, Batam Centre
Jalan Sudirman No. 1
Batam 29400
Tel: (+62-778) 462-047/462-048
Fax: (+62-778) 462-240/462-259
Website: www.bpbatam.go.id

DKI Jakarta City Development Coordinator
Dinas Pengawasan dan Penertiban Bangunan Pemprov DKI Jakarta
Jalan Taman Jatibaru No. 1
Jakarta 10150
Tel: (+62-21) 344-8043
Website: www.dppb.jakarta.go.id

Indonesian Institute of Architects
Ikatan Arsitek Indonesia (IAI)
Jakarta Design Centre, Level 7
Jalan Gatot Subroto Kav.53
Slipi, Jakarta 10260
Tel: (+62-21) 530-4715
Fax: (+62-21) 530-4722
E-mail: sekretariat@iai.or.id/iaijkt@gmail.com
Website: www.iai.or.id

Indonesian Contractors' Association
Asosiasi Kontraktor Indonesia
Wijaya Graha Puri Blok D-1
Jl. Darmawangsa Raya No. 2
Jakarta 12160
Tel: (+62-21) 720-0794/727-90672
Fax: (+62-21) 720-6805

E-mail: akinet@aki.or.id
Website: www.aki.or.id

Indonesian Society of Civil and Structural Engineers
Himpunan Ahli Konstruksi Indonesia (HAKI)
Jalan Tebet Barat Dalam 10 No. 5
Jakarta 12810
Tel: (+62-21) 835-1186/829-8518
Fax: (+62-21) 831-6451/835-1186
E-mail: haki@haki.or.id
Website: www.haki.or.id

Institution of Engineers Indonesia
Persatuan Insinyur Indonesia
Jl. Bandung No. 1
Menteng
Jakarta Pusat 10310
Tel: (+62-21) 319-04251/319-04252
Fax: (+62-21) 319-04657
E-mail: sekretariat@bkti-pii.or.id
Website: www.bkti-pii.or.id

National Association of Indonesian Consultant
Ikatan Nasional Konsultan Indonesia (INKINDO)
Jalan Bendungan Hilir Raya No. 29
Jakarta Pusat 10210
Tel: (+62-21) 573-8577
Fax: (+62-21) 573-3474
E-mail: info@inkindo.org
Website: www.inkindo.org

Indonesian Chamber of Commerce and Industry
Kamar Dagang dan Industri Indonesia
Menara Kadin Indonesia Level 29
Jalan HR Rasuna Said X-5 Kav 2-3
Jakarta 12950
Tel: (+62-21) 527-4484
Fax: (+62-21) 527-4331/527-4332
E-mail: sekretariat@kadin-indonesia.or.id/kadin@kadin-indonesia.or.id
Website: www.kadin-indonesia.or.id

National Contractors' Association of Indonesia
Gabungan Pelaksana Kontruksi Nasional Indonesia (GAPENSI)
Graha GAPENSI

Jl. Raya Ragunan No. C1
Jati Padang, Pasar Minggu
Jakarta 12540
Tel: (+62-21) 788-47247
Fax: (+62-21) 780-6119
E-mail: bppgapensi@link.net.id
Website: www.gapensi.org

Real Estate Indonesia
Persatuan Perusahaan Realestat Indonesia
Rukan Simprug Indah
Jl. Teuku Nyak Arief No.9B Kebayoran Lama
Jakarta Selatan 12210
Tel: (+62-21) 727-89105
Fax: (+62-21) 727-89155
E-mail: dpprei@yahoo.com
Website: www.rei.or.id

Chapter 9

Japan

All data relate to 2013 unless otherwise indicated.

Population	
Population	127.2 mn
Urban population (2010)	66.8%
Population under 15	12.8%
Population 65 and over	25.1%
Average annual growth rate	–0.17%
Geography	
Land area	377,835 km^2
Agricultural area	12.6%
Capital city	Tokyo
Population of capital city	13.28 mn
Economy	
Monetary unit	Yen (¥)
Exchange rate (average fourth quarter of 2013) to:	
The pound sterling	¥ 166.00
The US dollar	¥ 102.00
The euro	¥ 140.00
Average annual inflation (2001–2013)	–0.19%
Inflation rate	–1.44%
Gross Domestic Product (GDP)	¥ 472,600 bn
GDP per capita	¥ 3,707,000
Average annual real change in (GDP) (2013)	2.3%
Private consumption as a proportion of GDP	55.9%
Public consumption as a proportion of GDP	23.5%
Investment as a proportion of GDP	20.6%
Construction	
Gross value of construction output (2013 est.)	¥ 49,950 bn

THE CONSTRUCTION INDUSTRY

Construction output

The estimated gross value of construction output in 2013 was ¥ 49,950 billion.

Table 9.1 shows the breakdown of work by type of construction for 2013.

Of the total value of construction completed in 2013, 56% was undertaken by the private sector. Residential building made up of 53% of the total private construction.

Characteristics and structure of the industry

As of March 2012, there were about 483,639 construction contractors licensed either by the Ministry of Construction or by the Governors of Prefectures employing over 3.3 million people, a decline of 3.0% from the previous year. Of the total number, 119 are foreign firms licensed to engage in construction activities in Japan. There are 42 American construction or engineering companies operating either independently or through partnerships or joint ventures with their local counterparts. Most of the contracting firms are small and medium size with more than 97% having capitalisation of less than ¥ 50 million.

The past few years of recession and the contraction of the industry had resulted in the bankruptcies of many firms – some of which were public listed companies. However, the Japanese economic landscape has changed recently and shown gradual signs of recovery, resulting in a decline in the number of firms becoming insolvent (from 4,467 companies in 2011 to 2,632 companies in 2012). Further growth in the construction industry is anticipated arising from the strong demand for rebuilding/reconstruction works from the great earthquake that struck Tohoku area, the Northern part of Japan in 2011. The industry will also benefit from the high volume of construction works required in preparation of the Olympic Games 2020 which will be held in Tokyo, Japan.

As slowdown in the domestic construction market in the long term is inevitable, Japanese construction firms will continue to secure overseas

Table 9.1 Value of work done by type of construction, 2013

Type of construction	*Public (¥ billion)*	*Private (¥ billion)*	*Total (¥ billion)*	*% of total*
Residential	460	14,890	15,350	31
Non-residential	3,150	7,780	10,930	22
Civil engineering	18,350	5,320	23,670	47
Total	21,960	27,990	49,950	100

Source: Ministry of Land Infrastructure and Transport (Statistics Bureau).

Table 9.2 International Japanese contractors primarily involved in building, 2012

Major contractors	*ENR rank 2012*
Obayashi Corporation	51
Kajima Corporation	44
Taisei Corporation	60
Takenaka Corporation	74
Shimizu Corporation	80
Penta-Ocean Construction Co. Ltd	87
Maeda Corporation	N/A
Hazama Corporation	N/A
Sumitomo Mitsui Construction Co. Ltd	172
Nishimatsu Construction Co. Ltd	128
Toda Corporation	196

Source: Engineering News Record 2008 Top 225 International Contractors.

work. In spite of this effort, construction orders from overseas works have decreased from ¥ 1,350 billion in 2011 to ¥ 1,180 billion in 2012, a decrease of approximately 12.5%.

Table 9.2 shows the list of International Japanese contractors that are primarily involved in building, as ranked in the *Engineering News Record's 2012 Top 225 International Contractors*.

The *Construction Industry Law* requires contractors to obtain a licence to start a construction business. Nearly all site work in Japan is undertaken by specialty trade contractors who maintain a special relationship with a general contractor, known as a *ZENECON*. Under this relationship, the general contractor will endeavour to provide continuous employment for his subcontractors, in return for which each subcontractor will allow the general contractors to stipulate a contract price, and to monitor both his financial and project performance. Very large companies do not have a permanent workforce, but a family of subcontractors who are loosely connected to them.

One of the features of contracting organisations in Japan is that they undertake a considerable amount of research and development work. The range of research is very wide, from soil testing, environmental technology, information technology to air-supported domes. Earthquake engineering is important and the Japanese are generally regarded as world leaders in both research on the use of robots in construction and the development of intelligent buildings. Direct expenditure on research and development has been on the decline but amongst the top five construction firms, it continues to account for about 1% of total turnover.

For private sector projects, the contractor would normally checks all designs and products to be used in the project and reports to the client of

any possible failures. The high level of responsibility placed on the contractor for the success of projects is one of the reasons why in-house research and development departments are needed.

The Ministry of Land and Infrastructure, Transport and Tourism (MLIT) oversees all aspects of construction. Research institutes and other organisations are under its control although each research institute has a large degree of autonomy. Construction is also monitored by other ministries such as the Ministry of Agriculture.

There are three types of architectural engineer in Japan: first-class architectural engineer, second-class architectural engineer and wooden building architectural engineer. With effect from May 2009, qualified architectural engineers must be specialised in structural engineering and M&E will be required for designated buildings. First-class architectural engineer, who has worked for over 5 years as structural or facility engineer, must attend a set of lectures provided by the registration and lecture institutions listed by the MLIT before getting a licence. The other two categories are dealt with on a similar basis by prefecture governors. About 50% of first-class architects and most second-class architects work for contractors.

Table 9.3 shows the breakdown of licensed architects in September 2013.

Foreign architects seeking to register as first-class architects can obtain a licence (Apec Architect) without having to take examination if they are recognised by the Minister of Construction as possessing equivalent qualifications to that of a first-class architect.

Clients and finance

To encourage private sector involvement in public works projects, the Government has adopted a scheme modelled along the lines of the UK's Private Finance Initiative (PFI). Prefecture and local Governments are also exploring the use of such scheme for the construction of toll roads, government buildings and other infrastructure projects.

Table 9.3 Number of licensed architects, September 2013

Class	*No. of architects*
First-class architect	352,453
Second-class architect	742,122
Wooden building architect	17,203
Total	1,111,778

Source: Ministry of Land and Infrastructure, Transport and Tourism.

Selection of design consultants

For projects that are not on design-and-build procurement route, architects, engineers and cost consultants are usually appointed by the client either directly or after some form of competition. In some cases, other consultants are chosen by one of the main consultants. The most important basis for selection is track record with price as a secondary factor. Personal contacts and recommendations are sometimes relevant in the private sector but rarely in the public sector. In cases where the contractor is being appointed prior to other consultants, the client will be requested by the contractor to appoint an architect – often one of his selections. The architect would, however, still be paid by the client.

Contractual arrangements

In the public sector, construction companies of the relevant category and experience are invited to bid. Central and local Governments rank construction firms according to current and past track records, sales, financial status and technological capabilities when pre-qualifying those who will be on the tender list. The contract is then awarded to the lowest bidder. In the private sector, the client may appoint a specific contractor or invite selected contractors to bid – the latter being the more common system. Construction management system has generated much interest in the industry among the consultants and contractors. A recommendation to adopt construction management system was included in the paper (New action agenda concerning cost reduction members for public construction works) issued by the Committee on Administrative Reforms in 2000.

Generally, the Japanese contracting system is based on trust and mutual understanding. It is considered very important for both parties to maintain a good and long-term relationship. Lawyers are rarely present during negotiations as it implies mistrust, and litigation is only used as the last resort. The contractor generally prepares the shop drawings, except for building services which are the responsibility of the specialist contractor.

The following are the two most commonly used standard contract forms:

- *Standard Form of Agreement and General Conditions of Government Contract for Works of Building and Civil Engineering*, prepared and recommended by the Construction Industry Council of Japan.
- *General Conditions of Construction Contract (GCCC)* approved jointly by the Architectural Institute of Japan, Architectural Association of Japan, Japan Institute of Architects, National General Contractors Association of Japan, Building Contractors Society, Japan Federation of Architects and Building Engineers Association and the Japan Federation of Architect Offices Association.

There is no bill of quantities for most cases but the contractor submits an itemised list of prices (including quantities) with his tender. Liquidated damages are payable if a project is delayed, and there is a defects liability period of 2 years for brick or concrete buildings and 1 year for timber structures which are extended to 10 and 5 years, respectively, if the defects have been wilfully caused or were due to negligence of the contractor. The employer is given expressed rights to rectify the work and negotiations take place on dates and costs.

Liability and insurance

Although the designer has primary responsibility for defects attributable to design, in some cases, the contractor corrects the defects in order to retain the confidence of the client. Some architects do not carry professional indemnity.

The Registration Organization for Warranties Houses, administered by the MLIT, provides a warranty scheme. It gives a 10-year guarantee on the durability of structural components, including foundations, floors, walls and roof plus a 5-year warranty on the weather resistance of roof. In 2000, a 10-year warranty for all areas to prevent water penetration was launched. The scheme is available to detached house builders using traditional Japanese timber construction techniques. Prefabricated house builders and condominium builders who compete with the single unit homebuilders, also provides a 10-year protection on structural components.

CONSTRUCTION COST DATA

Cost of labour

The figures that follow are typical of labour costs in the Tokyo area as at the fourth quarter of 2013. The wage rate is the basis of an employee's income.

	Wage rate (per day) ¥	*Number of hours worked per year*
Site operatives		
Mason/bricklayer	21,900	2,230
Carpenter	22,800	2,230
Plumber	19,500	2,230
Electrician	21,700	2,230
Structural steel erector	22,000	2,230
HVAC installer	18,800	2,230
Semi-skilled worker	17,200	2,230

Continued

	Wage rate (per day) ¥	*Number of hours worked per year*
Unskilled labourer	12,800	2,230
Equipment operator	20,200	2,230
Watchman/security	11,300	2,230
Site supervision		
General foreman	23,115	2,230
Trades foreman	24,150	2,230
Contractors' personnel		
Site manager	45,200	2,300
Resident engineer	34,900	2,300
Resident surveyor	34,900	2,300
Junior engineer	15,300	2,300
Junior surveyor	15,300	2,300
Planner	15,300	2,300
Consultants' personnel		
Senior architect	45,900	2,020
Senior engineer	45,900	2,020
Senior surveyor	31,100	2,020
Qualified architect	38,300	2,020
Qualified engineer	38,300	2,020
Qualified surveyor	24,700	2,020

Cost of materials

The figures that follow are the costs of main construction materials, delivered to site in the Tokyo area, as incurred by contractors in the fourth quarter of 2013. These assume that the materials would be in quantities as required for a medium-sized construction project and that the location of the works would be neither constrained nor remote.

	Unit	*Cost ¥*
Cement and aggregates		
Ordinary Portland cement in 25 kg bag	tonne	17,600
Coarse aggregates for concrete	m^3	3,850
Fine aggregates for concrete	m^3	4,650
Ready mixed concrete (210 kg cement/cm^2)	m^3	12,800

Continued

	Unit	*Cost ¥*
Steel		
Mild steel reinforcement (235 N/mm^2)	tonne	84,000
High tensile steel reinforcement (295 N/mm^2)	tonne	66,000
High tensile steel reinforcement (345 N/mm^2)	tonne	68,000
Pre/post-compressing tendons	tonne	343,000
Structural steel sections (400 N/mm^2)	tonne	79,000
Bricks and blocks		
Common bricks (210 × 100 × 60 mm)	1,000	205,000
Good-quality facing bricks (210 × 100 × 60 mm)	1,000	320,000
Hollow concrete blocks (190 × 190 × 390 mm)	1,000	250,000
Solid concrete blocks (190 × 190 × 200 mm)	each	N/A
Precast concrete cladding units with exposed aggregate finish	m^2	14,200
Timber and insulation		
Softwood sections for carpentry	m^3	54,000
Softwood for joinery	m^3	130,000
Hardwood for joinery	m^3	272,000
Exterior quality plywood (12 mm)	m^2	1,365
Plywood for interior joinery (5 mm)	m^2	720
Softwood strip flooring (15 mm)	m^2	11,700
Chipboard sheet flooring (15 mm)	m^2	883
Softwood internal door complete with frames and ironmongery	each	N/A
Glass and ceramics		
Float glass (5 mm)	m^2	1,200
Sealed double glazing units (FL3 + A6 + FL3) 12 mm thick	m^2	3,040
Good quality ceramic wall tiles (150 × 150 mm)	m^2	2,550
Plaster and paint		
Plaster in 2 kg bags	tonne	52,400
Plasterboard (9 mm thick)	m^2	164
Emulsion paint in 5 litre tins	kg	325
Gloss oil paint in 5 litre tins	kg	435
Tiles and paviors		
Clay floor tiles (200 × 200 mm)	m^2	4,650
Vinyl floor tiles (2 × 300 × 300 mm)	m^2	810
Precast concrete paving slabs (300 × 300 × 60 mm)	m^2	4,170

Continued

	Unit	*Cost ¥*
Clay roof tiles	m^2	3,100
Precast concrete roof tiles	m^2	2,100
Drainage		
WC suite complete	each	48,300
Lavatory basin complete	each	27,100
100 mm diameter clay drain pipes	m	N/A
150 mm diameter stainless-steel drain pipes	m	10,410

Unit rates

The descriptions that follow are generally shortened versions of standard descriptions listed in full in Chapter 19. Where an item has a two-digit reference number (e.g. 05 or 33), this relates to the full description against that number in Chapter 19. Where an item has an alphabetic suffix (e.g. 12A or 34B) this indicates that the standard description has been modified. Where a modification is major the complete modified description is included here and the standard description should be ignored; where a modification is minor (e.g. the insertion of a named hardwood) the shortened description has been modified here but, in general, the full description in Chapter 19 prevails.

The unit rates that follow are main work items on a typical construction project in the Tokyo area in the fourth quarter of 2013. The rates include all necessary labour, materials and equipment. Allowances to cover preliminary and general items and contractors' overheads and profit have been added to the rates.

		Unit	*Rate ¥*
Excavation			
01	Mechanical excavation of foundation trenches	m^3	800
02	Hardcore filling making up levels	m^3	4,900
03	Earthwork support	m^2	33,400
Concrete work			
04	Plain *in situ* concrete in strip foundations in trenches	m^3	13,870
05	Reinforced *in situ* concrete in beds	m^3	14,000
06	Reinforced *in situ* concrete in walls	m^3	13,850
07	Reinforced *in situ* concrete in suspended floors or roof slabs	m^3	13,850
08	Reinforced *in situ* concrete in columns	m^3	13,850

Continued

		Unit	*Rate ¥*
09	Reinforced *in situ* concrete in isolated beams	m^3	13,850
10	Precast concrete slabs	m^2	15,250
Formwork			
11	Softwood formwork to concrete walls	m^2	4,550
12	Softwood formwork to concrete columns	m^2	4,550
13	Softwood or metal formwork to horizontal soffits of slabs	m^2	3,780
Reinforcement			
14	Reinforcement in concrete walls	tonne	112,000
15	Reinforcement in suspended concrete slabs	tonne	112,000
Steelwork			
17	Fabricate, supply and erect steel framed structure	tonne	149,000
18	Framed structural steelwork in universal joists sections	tonne	N/A
19	Structural steelwork lattice roof trusses	tonne	N/A
Brickwork and blockwork			
20	Precast lightweight aggregate hollow concrete block walls	m^2	5,100
21A	Solid (perforated) common bricks	m^2	N/A
Roofing			
24	Concrete interlocking roof tiles 430 × 380 mm	m^2	7,410
25	Plain clay roof tiles 260 × 160 mm	m^2	9,000
26	Fibre cement roof slates 600 × 300 mm	m^2	2,360
27	Sawn softwood roof boarding	m^2	N/A
28	Particle board roof coverings	m^2	2,140
29	Three layers glass-fibre-based bitumen felt roof covering	m^2	4,470
30	Bitumen-based mastic asphalt roof covering	m^2	4,500
31	Glass-fibre mat roof insulation 160 mm thick	m^2	2,010
33	Troughed galvanised steel roof cladding	m^2	3,010
Woodwork and metalwork			
34	Preservative-treated sawn softwood 50 × 100 mm	m	730
37	Two-panel glazed door in hardwood size 850 × 2000 mm	each	75,200
38	Solid core half hour fire resisting hardwood internal flush door, size 800 × 2000 mm	each	N/A
39	Aluminium double-glazed window, size 1200 × 1200 mm	each	37,830
40	Aluminium double-glazed door, size 850 × 2100 mm	each	52,240
41	Hardwood skirtings	m	1,330

Continued

		Unit	*Rate ¥*
Plumbing			
42A	UPVC half round eaves gutter (100 mm diameter)	m	2,450
43	UPVC rainwater pipes	m	2,880
44A	Light gauge copper cold water tubing (15 mm diameter)	m	2,120
45A	High-pressure plastic pipes for cold water supply (15 mm diameter)	m	1,300
46	Low-pressure plastic pipes for cold water distribution	m	1,300
47	UPVC soil and vent pipes	m	5,020
48	White vitreous China WC suite	each	92,900
49	White vitreous China lavatory basin	each	68,300
51	Stainless steel single bowl sink and double drainer	each	91,100
Electrical work			
52	PVC insulated and copper-sheathed cable	m	430
53	13 amp unswitched socket outlet	each	2,050
54	Flush-mounted 20 amp, 1-way light switch	each	1,890
Finishings			
55A	Two coats gypsum-based plaster on concrete walls 20 mm thick	m^2	2,670
56	White-glazed tiles on plaster walls	m^2	6,550
57	Red clay quarry tiles on concrete floors	m^2	10,100
58A	Cement and sand screed to concrete floors 30 mm thick	m^2	1,970
59	Thermoplastic floor tiles on screed	m^2	2,270
60	Mineral fibre tiles on concealed suspension system	m^2	4,410
Glazing			
61	Glazing to wood	m^2	N/A
Painting			
62	Emulsion on plaster walls	m^2	1,220
63	Oil paint on timber	m^2	770

Approximate estimating

The building costs per unit area that follow are averages incurred by building clients for typical buildings in the Tokyo area as at the fourth quarter of 2013. They are based upon the total floor area of all storeys, measured between external walls and without deduction for internal walls. Approximate estimating costs generally include mechanical and electrical installations but exclude furniture, loose or special equipment, and external

works; they also exclude fees for professional services. The costs shown are for specifications and standards appropriate to Japan and this should be borne in mind when attempting comparisons with similarly described building types in other countries. A discussion of this issue is included in Chapter 2. Comparative data for countries covered in this publication, including construction cost data, are presented in Part III.

Approximate estimating costs must be treated with caution; they cannot provide more than a rough guide to the probable cost of building.

	Cost m² ¥	*Cost ft² ¥*
Industrial buildings		
Factories for letting	173,000	16,000
Factories for owner occupation (light industrial use)	173,000	16,000
Factories for owner occupation (heavy industrial use)	190,000	18,000
Factory/office (high tech) for letting (shell and core only)	232,000	22,000
Factory/office (high tech) for letting (ground floor shell, first floor offices)	257,000	24,000
Factory/office (high tech) for owner occupation (controlled environment, fully finished)	280,000	26,000
High tech laboratory workshop centres (air-conditioned)	359,000	33,000
Warehouses, low bay (6–8 m high) for letting	117,000	11,000
Warehouses, low bay for owner occupation	110,000	10,000
Warehouses, high bay for owner occupation	138,000	13,000
Administrative and commercial buildings		
Offices for letting, 5–10 storeys, non-air-conditioned	232,000	22,000
Offices for letting, 5–10 storeys, air-conditioned	258,000	24,000
Offices for letting, high rise, air-conditioned	300,000	28,000
Offices for owner occupation high rise, air-conditioned	270,000	25,000
Prestige/headquarters office, 5–10 storeys, air-conditioned	336,000	31,000
Prestige/headquarters office, high rise, air-conditioned	406,000	38,000
Health and education buildings		
General hospitals (300 beds)	445,000	41,000
Private hospitals (100 beds)	378,000	35,000
Health centres	457,000	42,000
Primary/junior schools	274,000	25,000
Secondary/middle schools	297,000	28,000
University	414,000	38,000

Continued

	Cost m² ¥	*Cost ft² ¥*
Recreation and arts buildings		
Theatres (>500 seats)	480,000	45,000
Sports halls including changing and social facilities	246,000	23,000
City centre/central libraries	351,000	33,000
Branch/local libraries	324,000	30,000
Residential buildings		
Private/mass market single family housing two-storey detached/semi-detached (multiple units)	228,000	21,000
Purpose designed single family housing two-storey detached (single unit)	233,000	22,000
Social/economic apartment housing, high rise (with lifts)	249,000	23,000
Private sector apartment building (standard specification)	293,000	27,000
Private sector apartment buildings (luxury)	465,000	43,000
Student/nurses halls of residence	320,000	30,000
Homes for the elderly (shared accommodation)	294,000	27,000
Hotel, 5 star, city centre	640,000	59,000
Hotel, 3 star, city/provincial	421,000	39,000

Regional variations

The approximate estimating costs are based on projects in Tokyo. These costs should be adjusted by the following factors to take account of regional variations:

Nagoya	:	–4%
Osaka	:	–4%
Hiroshima	:	–4%
Fukuoka	:	–6%
Sapporo	:	–3%

EXCHANGE RATES AND INFLATION

The combined effect of exchange rates and inflation on prices within a country and price comparisons between countries is discussed in Chapter 2.

Exchange rates

Figure 9.1 plots the movement of the Japanese yen against the sterling, the euro and the US dollar since 2003. The values used in the figure are

Figure 9.1 The Japanese yen against sterling, euro and US dollar.

quarterly and the method of calculating these is described and general guidance on the interpretation of the figure are provided in Chapter 2. The average exchange rate in the fourth quarter of 2013 was ¥ 166 to pound sterling, ¥ 140 to euro and ¥ 102 to US dollar.

Price inflation

The table below presents consumer price and building cost indices in Japan since 1980.

	Consumer price index		*Building cost index*	
Year	*Average Index*	*Average change %*	*Average index*	*Average change %*
1980	100		100	
1981	105	5.0	103	3.0
1982	108	2.9	104	1.0
1983	110	1.9	103	–1.0
1984	112	1.8	103	0.0
1985	115	2.7	103	0.0
1986	115	0.0	102	–1.0
1987	115	0.0	104	2.0

Continued

	Consumer price index		Building cost index	
Year	Average Index	Average change %	Average index	Average change %
1988	116	0.9	111	6.7
1989	119	2.6	118	6.3
1990	122	2.5	127	7.6
1991	126	3.3	135	6.3
1992	128	1.6	136	0.8
1993	130	1.3	132	–3.4
1994	131	0.7	126	–4.7
1995	130	–0.1	122	–3.1
1996	130	0.1	120	–1.5
1997	133	1.8	119	–0.6
1998	134	0.6	117	–2.0
1999	133	–0.3	116	–0.9
2000	132	–0.7	116	+0.1
2001	131	–0.7	114	–1.7
2002	130	–0.9	113	–1.0
2003	130	–0.3	113	+0.6
2004	130	–0.0	115	+1.1
2005	129	–0.3	116	+1.0
2006	129	–0.0	118	+2.1
2007	129	–0.0	120	+1.9
2008	129	–0.0	124	+3.0
2009	127	–1.4	120	–3.4
2010	126	–0.7	120	+0.1
2011	126	–0.3	116	–3.1
2012	126	0.0	115	–0.9
2013	126	+0.3	118	+2.4

USEFUL ADDRESSES

Public Organisations

The Associated General Contractors of Japan, Inc
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Fax: (81) 3 3456 2058
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Website: www.aij.or.jp

The Building Centre of Japan
1-9 Kanda Nishiki-cho
Chiyoda-ku
Tokyo 101-8986
Tel: (81) 3 5283 0479
Fax: (81) 3 5281 2822
Website: www.bcj.or.jp

The Building Surveyors' Institute of Japan
Sunrise Mita building 3F
3-16-12 Shiba, Minato-ku
Tokyo 105-0014
Tel: (81) 3 3453 9591
Fax: (81) 3 3453 9597
E-mail: HP@bsij.or.jp
Website: www.bsij.or.jp

Construction Research Institute
11-8 Nihonbashi – Odenmachou
Chuo-ku
Tokyo 103-0011
Tel: (81) 3 3663 2411
Fax: (81) 3 3663 2417
Website: www.kensetu-bukka.or.jp

The Japan Chamber of Commerce and Industry
3-2-2 Marunouchi
Chiyoda-ku
Tokyo 100-0005
Tel: (81) 3 3283 7500
Website: www.jcci.or.jp

The Japan Civil Engineering Consultants Association
KY Sanbancho building 7-8F
Sanbancho
1-chome, Chiyoda-ku
Tokyo 102-0075
Tel: (81) 3 3239 7992
Fax: (81) 3 3239 1869
E-mail: info@jcca.or.jp
Website: www.jcca.or.jp

Japan Federation of Construction Contractors
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2-5-1 Hacchobori
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Japanese Industrial Standards Committee
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Chapter 10

Malaysia

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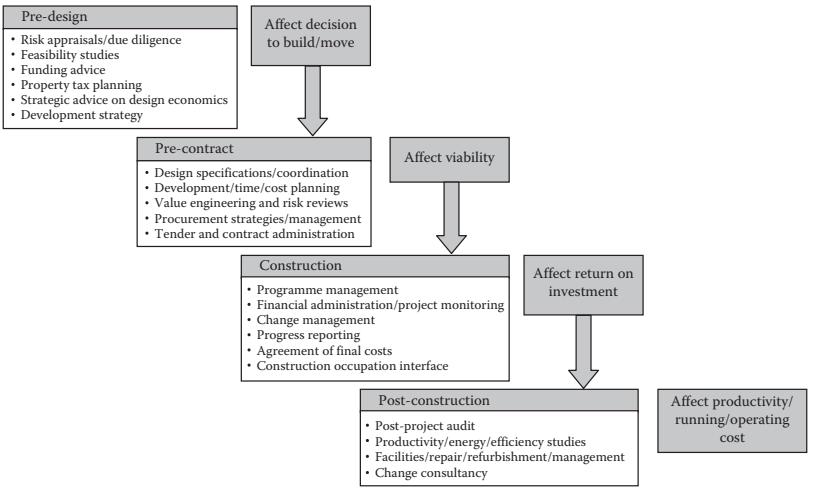
TYPICAL PROJECT STAGES, INTEGRATED SERVICES AND THEIR EFFECT



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All data relate to 2013 unless otherwise indicated.

Population	
Population	29.9 mn
Urban population (2010)	71%
Population under 15	26%
Population 65 and over	6%
Average annual growth rate (2010–2013)	1.6%
Geography	
Land area	330,252 km^2
Agricultural area	24%
Capital city	Kuala Lumpur
Population of capital city	1.7 mn
Economy	
Monetary unit	Malaysian ringgit (RM)
Exchange rate (average fourth quarter of 2013) to:	
The pound sterling	RM 5.20
The US dollar	RM 3.21
The euro	RM 4.37
The yen × 100	RM 3.20
Average annual inflation (2010–2013)	7.0%
Inflation rate (2013 est.)	2.0%
Gross domestic product (GDP) (2013 est.)	RM 786.5 bn
GDP per capita (2013 est.)	RM 26,264
Average annual real change in GDP (2010–2013)	12.0%
Private consumption as a proportion of GDP (2013 est.)	51.9%
Public consumption as a proportion of GDP (2013 est.)	13.5%
Investment as a proportion of GDP (2013 est.)	28.7%
Construction	
Gross value of construction output	N/A
Net value of construction output (2013 est.)	RM 29,332 mn
Net value of construction output as a proportion of GDP	3.7%

THE CONSTRUCTION INDUSTRY

The Malaysian construction industry has consistently contributed to the economy. It did very well in year 2013 by recording an 18% growth compared with year 2012 despite the gloomy global economy.

As at third quarter of 2013, the construction sector posted a double-digit growth of 10.1% induced by the vigorous performance of residential projects at 21.2% and a turnaround in non-residential to 8.1% (Q2 2013: –0.9%).

The strong performance of the construction sector is expected to continue, driven by domestic demand generated particularly through the Government's Economic Transformation Programme (ETP) which was formulated in the year 2010 as part of Malaysia's National Transformation Programme (NTP) to transform the national economy.

The Government has finally taken positive steps to introduce much needed structural corrections not only to liberalise the economy further but also to address a continued public budget deficit situation since 1999. Subsidy rationalisation programme is set to continue as the Government looks to a further 15% increase in subsidy, from its more than RM 20 billion in yearly subsidies bills on mainly fuel and energy as well as to implement a long anticipated entry of the broad based, all-encompassing goods and services tax regime in place of the current sales and services tax. Year 2014 and 2015 are set to be transitional years with the Government pushing for the consolidation of much needed structural and taxation reforms for the country.

Mega construction projects under the public–private partnership model featured heavily under the 10th Malaysia Plan (2011–2015) as a result of the need for positive stimulus from the Government amidst a much weakened global market situation. Private financing initiative (PFI), first envisaged under the 9th Malaysia Plan as a new measure under the privatisation programme to increase opportunities for the private sector to participate in infrastructure and utilities development, provided the catalyst funding necessary to drive the industry forward.

In terms of volume, the construction industry generated some RM10 billion in the third quarter of 2013 for a projected RM 40 billion year-on-year volume, all things being equal. Growth rates meanwhile continue following the cyclical trend that is typical of the industry, with the second half of 2013 looking to be the steep ascent prior to peaking with positive growth in both the second and third quarter at 5.3% and 6.1%, respectively.

The breakdown of work done by the type of construction for 2013 (based on the latest official statistics available) is shown in Table 10.1.

The engineering sub-sector continues to gather momentum in overall volume despite dipping slightly in the third quarter of 2013 as margins tightened for the residential and non-residential sub-sectors due to escalating

Table 10.1 Value of new work done by type of construction, 2013

		Value of construction work done (RM million)			
Quarter	*Total (RM million)*	*Residential buildings*	*Non-residential buildings*	*Civil engineering*	*Special trade*
Q1/13	20,613	5,413	6,714	7,603	884
Q2/13	22,717	6,484	7,123	8,025	1,086
Q3/13	22,852	6,253	7,869	7,667	1,062

Source: Quarterly construction statistics – Department of Statistics, Malaysia.

construction costs especially labour and operational costs; a direct result of the subsidy rationalisation programme embarked by the Government impacting on energy, fuel and labour prices. In the housing sector, there is a quiet shift to affordable homes amongst the biggest developers as the Government introduces a spate of regulations to curtail sky rocketing property prices. Penang, the Klang Valley outskirts and Iskandar Malaysia in the southern state are set to continue being the main focal points for growth in this segment even as developers hold back new launches in a wait and see stance on the implementation of the various measures specially introduced to curtail speculative purchases.

Office and commercial property developments, meanwhile, face concerns of space glut with incoming additional supply from planned and ongoing developments worsening the current office vacancy situation in Kuala Lumpur. The office space overhang situation in the Klang Valley especially had deteriorated for the fifth straight year in 2012, as a surge in demand of 4.8 million sq ft was overwhelmed by a flood of 7.8 million sq ft of new supply. It is estimated that a further 17 million sq ft of new office space will be available by 2017 from the Tun Razak Exchange project, the 118-storey Merdeka Warisan Tower, KL Eco City and Naza TTDI KL Metropolis. This will put pressure on rentals over the next 1–2 years. Overall, occupancy rate is however as high as 80% despite some 2 million sq ft vacant in June 2013.

Concerns of space glut situation notwithstanding, purpose-built office, shopping complex and mixed-use sub-sectors will continue to be the mainstay for the commercial building segments. Combining office, residential and retail makes full use of the available space at the same time of populating projects with the much needed tenants.

Consecutive strong growths have allowed the construction industry to maintain its employment rate records at just slightly below 10% of the total workforce utilisation in the country, with a total of 1.23 million workers employed in 2013, an increase of 5.45% as compared to the 1.16 million workers employed in 2012.

Characteristics and structure of the industry

The main regulatory agency for the construction industry is the Construction Industry Development Board Malaysia (CIDB). Since July 1995, all local and foreign contractors have to register with CIDB before undertaking any construction works in Malaysia.

Local construction companies are registered under seven grades (G1–G7), based on three main criteria: tendering capacity, financial capacity and availability of human resources. As of January 2014, there are 66,641 registered companies classified as given in Table 10.2.

For Government-funded projects, local and foreign construction companies are required by the Ministry of Finance and Public Works Department

Table 10.2 Number of registered companies by grade, January 2014

Registration grade	*Limit of project size*	*Number of registered companies*
Grade 1	<RM 100,000	34,511
Grade 2	<RM 500,000	9,243
Grade 3	<RM 1,000,000	8,824
Grade 4	<RM 3,000,000	3,038
Grade 5	<RM 5,000,000	4,120
Grade 6	<RM 10,000,000	1,585
Grade 7	No limit	5,320

Source: Construction Industry Development Board Malaysia.

(PWD) to register with *Pusat Khidmat Kontraktor (Contractor Service Centre or PKK)*, which is under the Ministry of Works.

The professions are regulated by the respective professional bodies – *Pertubuhan Akitek Malaysia (PAM)*, Institution of Engineers Malaysia, Association of Consulting Engineers Malaysia, and the Royal Institution of Surveyors Malaysia. Individual professional consultants are required to register with their respective professional boards.

Table 10.3 shows the number of registered professionals in 2012.

The title of architect is protected by the *Architects Act 1967 (Revised 1972)* and restricted to an individual registered with the Board of Architects Malaysia.

Registration with the Board of Quantity Surveyors Malaysia is a condition precedent for a quantity surveyor to practise in Malaysia and use the designation.

The Royal Institution of Surveyors Malaysia (RISM) is the official professional body of the surveying profession in Malaysia and comprises four sections: quantity surveying, property, consultancy and valuation surveying, land surveying and building surveying. As of 22 January 2014, ISM has a total of 6,904 members; 3,512 in the quantity surveying section, 1,334 in the property, management and valuation surveying section, 1,378 in the land surveying and 680 in the building surveying section.

Clients and finance

Investment in the construction industry is dominated by the private sector as a result of the privatisation programme promulgated by the Government

Table 10.3 Number of registered professionals in Malaysia, 2012

	Architects	*Engineers*	*Surveyors*
Total	3,637	82,080	6,840

Source: Yearbook of Statistics 2012 – Department of Statistics, Malaysia.

in 1983. Projects are procured through the sale and lease of assets, management contracts and build-operate-transfer (BOT) and its variants, build operate (BO) and build transfer (BT). The private sector will continue to play a key role in the country's economic growth. For 2014, the industry is projected to handle projects worth RM 115 billion, the bulk of which would be from non-residential construction contracts.

Private funding is arranged through banks, trust funds and insurance companies. Increased foreign participation has seen some large multinational companies providing a financing package for new projects.

Selection of design consultants

In the private sector, most consultants are selected and appointed by the developers based on track record and personal relationships besides cost consideration.

Project consultants for public sector projects are appointed through either open or selective bidding.

The push for privatisation has spurred design consultants to work with contractors in tendering for design and build projects and BOT projects.

Contractual arrangements

Public projects are commonly procured through open tendering where advertisements are placed in the major newspapers. Selective tendering is only used for projects which satisfy certain criteria. Approval from the Ministry of Finance must be obtained for this method of tendering to be used, and also on the names of the shortlisted tenderers. Similarly, for direct negotiations, the procurement agency must seek the approval of the Ministry of Finance.

Only contractors registered with PKK and CIDB can tender for public projects exceeding RM 50,000 in value. Projects funded by the World Bank and the Asian Development Bank are subject to the respective organisation's own tendering procedures.

In the private sector, tenders are invited through open and selective tendering, and by direct negotiations. For major projects, it is common to have a pre-qualification exercise to shortlist tenderers.

The Jabatan Kerja Raya (JKR) or Public Works Department and the CIDB have their own standard form of contract. In the private sector, the *PAM (Pertubuhan Akitek Malaysia)* Agreement and Conditions of Building Contract is widely adopted. The standard form was extensively revised and launched in April 2007 to replace the earlier *PAM* Forms. There are three versions: without quantities, with quantities and nominated subcontract forms.

Development control and standards

The law on building control consists of the various *Planning Acts, Uniform Building By-Laws and Street, Drainage and Building Act 1974*. Planning permission is a pre-requisite to any application for local authority approval for projects involving development or change of use.

The *Kuala Lumpur Building By-Law 1985* requires a qualified person (QP) to be appointed for both design and supervision of the execution of a development. A QP is defined as 'any architect, registered building draughtsman or engineer'. Occupation of a completed building requires a temporary certificate of fitness (TCOF) to be obtained. A certificate of fitness (COF) is granted when all building works are completed and reports and certificates are submitted to the authorities. As of April 2007, the COF is being replaced by the certificate of completion and compliance (CCC). The CCC is issued by the project's principal submitting person (PSP) who is either a professional architect, professional engineer or a registered building draughtsman allowed by the Architects Act to issue a CCC for buildings not exceeding two storey and an area less than 300 m^2.

Malaysian standards (MS) are developed and promulgated by SIRIM Berhad (formerly known as Standards and Industrial Research Institute of Malaysia before its corporatisation in September 1996).

CONSTRUCTION COST DATA

Cost of labour

The figures that follow are typical of labour costs in Kuala Lumpur as at the fourth quarter of 2013. Cost of labour indicates the cost to a contractor of employing that employee.

Labour rate (per day = 8 h)

	Wage rate (per day) RM	*Number of hours worked per year*
Site operatives		
Mason/bricklayer	111	2,304
Carpenter	122	2,304
Plumber	125	2,304
Electrician	137	2,304
Structural steel erector	121	2,304
HVAC installer	150	2,304
Semi-skilled worker	79	2,304

Continued

	Wage rate (per day) RM	*Number of hours worked per year*
Unskilled labourer	70	2,304
Equipment operator	118	2,304
Watchman/security	90	2,304
Site supervision	*(per month)*	
General foreman	5,000	2,304
Trades foreman	5,500	2,304
Clerk of works	4,000	2,304
Contractors' personnel		
Site manager	10,000	2,304
Resident engineer	9,500	2,304
Resident surveyor	8,000	2,304
Junior engineer	5,000	2,304
Junior surveyor	5,000	2,304
Consultants' personnel		
Senior architect	11,000	2,304
Senior engineer	10,000	2,304
Senior surveyor	8,000	2,304
Qualified architect	7,000	2,304
Qualified engineer	6,500	2,304
Qualified surveyor	6,000	2,304

Cost of materials

The figures that follow are the costs of main construction materials, delivered to site in the Kuala Lumpur area, as incurred by contractors in the fourth quarter of 2013. These assume that the materials would be in quantities as required for a medium-sized construction project and that the location of the works would be neither constrained nor remote.

	Unit	*Cost RM*
Cement and aggregate		
Ordinary Portland cement in 50 kg bags	tonne	362.00
Coarse aggregates for concrete in 20 mm granite	m^3	37.00
Ready mixed concrete (mix 1:2:4)	m^3	219.00
Ready mixed concrete (mix 1:1:2)	m^3	240.00

Continued

	Unit	*Cost RM*
Steel		
Mild steel reinforcement 10–40 mm diameter	tonne	3,980.00
High tensile steel reinforcement 10–40 mm diameter	tonne	3,590.00
Structural steel sections	tonne	7,570.00
Bricks and blocks		
Common bricks (215 × 102 × 65 mm)	pc	0.34
Good-quality facing bricks (210 × 100 × 70 mm)	pc	1.17
Hollow concrete blocks (190 × 390 × 190 mm)	pc	3.15
Solid concrete blocks integrated (190 × 390 × 190 mm)	pc	3.75
Timber and insulation		
Exterior quality plywood	m^2	30.00
Softwood strip flooring	m^2	918.00
Softwood internal door complete with frames and ironmongery	each	918.00
Glass and ceramics		
Float glass (5 mm)	m^2	47.40
Good-quality ceramic wall tiles (150 × 150 mm)	m^2	38.00
Plaster and paint		
Plasterboard (15 mm thick)	m^2	30.00
Emulsion paint in 5 litre tins	litre	20.65
Gloss oil paint in 5 litre tins	litre	23.45
Tiles and paviors		
Clay floor tiles (200 × 200 × 13 mm)	m^2	60.00
Vinyl floor tiles (300 × 300 × 2 mm)	m^2	35.00
Precast concrete paving slabs (300 × 300 × 60 mm)	m^2	70.00
Clay roof tiles	pc	5.75
Precast concrete roof tiles	pc	1.90
Drainage		
100 mm diameter clay drain pipes	m	53.00
150 mm diameter UPVC drain pipes	m	62.00

Unit rates

The descriptions that follow are generally shortened versions of standard descriptions listed in full in Chapter 19. Where an item has a two-digit reference number (e.g. 05 or 33), this relates to the full description against that number in Chapter 19. Where an item has an alphabetic suffix (e.g. 12A or 34B) this indicates that the standard description has been modified. Where a modification is major the complete modified description is included here and the standard description should be ignored; where a modification is minor (e.g. the insertion of a named hardwood) the shortened description

has been modified here but, in general, the full description in Chapter 19 prevails.

The unit rates that follow are for main work items in a typical construction project in the Kuala Lumpur area in the fourth quarter of 2013. The rates include all necessary labour, materials and equipment. Allowances of 6%–8% to cover preliminary and general items and 15% to cover contractors' overheads and profit have been included in the rates.

		Unit	*Rate RM*
Excavation			
01	Mechanical excavation of foundation trenches	m^3	28.00
02	Hardcore filling making up levels	m^3	80.00
Concrete work			
04A	Plain *in situ* concrete in strip foundations in trenches (C25)	m^3	270.00
05A	Reinforced *in situ* concrete in beds (C35)	m^3	310.00
06A	Reinforced *in situ* concrete in walls (C35)	m^3	310.00
07A	Reinforced *in situ* concrete in suspended floors or roof slabs (C35)	m^3	310.00
08A	Reinforced *in situ* concrete in columns (C35)	m^3	310.00
09A	Reinforced *in situ* concrete in isolated beams (C35)	m^3	310.00
Formwork			
11	Softwood formwork to concrete walls	m^2	45.00
12	Softwood formwork to concrete columns	m^2	45.00
13	Softwood to horizontal soffits of slabs	m^2	45.00
Reinforcement			
14	Reinforcement in concrete walls	tonne	4,000.00
15	Reinforcement in suspended concrete slabs	tonne	4,000.00
16	Fabric reinforcement in concrete beds (3 kg/m^2)	m^2	15.00
Steelwork			
17	Fabricate, supply and erect steel framed structure	tonne	7,000.00
18	Framed structural steelwork in universal joist sections	tonne	7,000.00
19	Structural steelwork lattice roof trusses	tonne	7,000.00
Brickwork and blockwork			
20	Precast lightweight aggregate hollow concrete block walls	m^2	65.00
21	Solid (perforated) common bricks	m^2	50.00
22	Sand lime bricks	m^2	50.00
23	Facing bricks	m^2	90.00

Continued

		Unit	*Rate RM*
Roofing			
24	Concrete interlocking roof tiles 430 × 380 mm	m^2	43.00
25	Plain clay roof tiles 260 × 160 mm	m^2	80.00
26	Fibre cement roof slates 600 × 300 mm	m^2	35.00
33	Troughed galvanised steel roof cladding	m^2	65.00
Woodwork and metalwork			
34	Preservative-treated sawn softwood 50 × 100 mm	m^3	3,500.00
35	Preservative-treated sawn softwood 50 × 150 mm	m^3	3,500.00
36	Single-glazed casement window in hardwood, size 650 × 900 mm	each	180.00
38	Solid core half-hour fire-resisting hardwood internal flush doors, size 800 × 2000 mm	each	1,056.00
39	Aluminium double-glazed window, size 1200 × 1200 mm	each	1,300.00
40	Aluminium double-glazed door, size 850 × 2100 mm	each	1,500.00
41	Hardwood skirtings	m	30.00
Plumbing			
42	UPVC half round eaves gutter	m	30.00
43	UPVC rainwater pipes 100 mm	m	65.80
47	UPVC soil and vent pipes 100 mm	m	55.00
48	White vitreous China WC suite	each	700.00
49	White vitreous China lavatory basin	each	450.00
51	Stainless steel single bowl sink and double drainer	each	350.00
Electrical Work			
52A–54A	PVC insulated and copper-sheathed cable with 13 amp switched socket outlet, flush-mounted 20 amp, 1-way light switch (within 10 m range)		
	Per power point	each	100–120
	Per light point	each	80–100
Finishings			
55A	Two coats gypsum-based plaster on concrete walls 20 mm thick	m^2	28.00
56	White-glazed tiles on plaster walls	m^2	73.00
58A	Cement and sand screed to concrete floors 30 mm thick	m^2	20.00
60	Mineral fibre tiles on concealed suspension system	m^2	60.00
Glazing			
61A	6 mm clear float glass; glazing to wood	m^2	60.00
Painting			
62	Emulsion on plaster walls	m^2	5.11
63	Oil paint on timber	m^2	6.50

Approximate estimating

The building costs per unit area that follow are averages incurred by building clients for typical buildings in the Kuala Lumpur area as at the fourth quarter of 2013. They are based upon the total floor area of all storeys, measured between external walls and without deduction for internal walls.

Approximate estimating costs generally include mechanical and electrical installations but exclude furniture, loose or special equipment, and external works; they also exclude fees for professional services. The costs shown are for specifications and standards appropriate to Malaysia and this should be borne in mind when attempting comparisons with similarly described building types in other countries. A discussion of this issue is included in Chapter 2. Comparative data for countries covered in this publication, including construction cost data, are presented in Part III.

Approximate estimating costs must be treated with caution; they cannot provide more than a rough guide to the probable cost of building.

	Cost m² RM	*Cost ft² RM*
Industrial buildings		
Factories for letting	1,480	137
Factories for owner occupation (light industrial use)	1,580	147
Factories for owner occupation (heavy industrial use)	1,960	182
Factory/office (high tech) for letting (shell and core only)	1,500	139
Factory/office (high tech) for letting (ground floor shell, first floor offices)	1,960	182
Factory/office (high tech) for owner occupation (controlled environment, fully finished)	2,000	186
High tech laboratory workshop centres (air-conditioned)	1,750	163
Administrative and commercial buildings		
Civic offices, non-air-conditioned	1,350	125
Civic offices, fully air-conditioned	1,730	161
Offices for letting, 5–10 storeys, non-air-conditioned	1,630	151
Offices for letting, 5–10 storeys, air-conditioned	2,000	186
Offices for letting, high rise, air-conditioned	2,760	256
Offices for owner occupation, 5–10 storeys, non-air-conditioned	2,040	190
Offices for owner occupation, 5–10 storeys, air-conditioned	2,400	223
Offices for owner occupation, high rise, air-conditioned	3,320	308
Prestige/headquarters office, 5–10 storeys, air-conditioned	3,010	280
Prestige/headquarters office, high rise, air-conditioned	3,950	367

Continued

		Cost m² RM	*Cost ft² RM*
Health and education buildings			
General hospitals (excluding specialist equipment and installation) (main hospital)	bed	315,000	
Private hospitals (excluding specialist equipment and installation)	bed	200,000	
Primary/junior schools		1,060	98
Secondary/middle schools		1,220	113
Recreation and arts buildings			
Theatres (>500 seats) including seating and stage equipment	Seat	13,000	
Theatres (<500 seats) including seating and stage equipment	Seat	16,000	
Concert halls including seating		4,670	434
Sports hall including changing and social facilities		1,970	183
Swimming pools (international standard) including changing and social facilities	each	1,418,000	
Swimming pools (schools standard) including changing facilities	each	525,000	
National museums including full air-conditioning and standby generator		3,990	371
Local museums including air-conditioning		3,380	314
Residential buildings			
Social/economic single family housing (multiple units)		990	92
Private/mass market single family housing two-storey detached/semi-detached (multiple units)		2,550	237
Purpose designed single family housing two–storey detached (single unit)		3,140	292
Social/economic apartment housing, low rise (no lifts)		780	72
Social/economic apartment housing, high rise (with lifts)		1,050	98
Private sector apartment building (standard specification)		1,750	163
Private sector apartment buildings (luxury)		3,910	363
Student/nurses halls of residence		1,170	109
Homes for the elderly (shared accommodation)		1,070	99
Homes for the elderly (self contained with shared communal facilities)		1,130	105
Hotel, 5 star, city centre (inclusive of FF & E)		8,090	752
Hotel, 3 star, city/provincial (ditto)		5,800	539
Motel (ditto)		3,130	291

Regional variations

The approximate estimating costs are based on projects in Kuala Lumpur. Adjust these costs by the following factors to take account of regional variations:

Selangor	:	0%
Penang	:	+5%
Johore	:	+15%
Kota Kinabalu	:	+15%
Kuching	:	+15%

EXCHANGE RATES AND INFLATION

The combined effect of exchange rates and inflation on prices within a country and price comparisons between countries is discussed in Chapter 2.

Exchange rates

Figure 10.1 plots the movement of the Malaysian ringgit against the sterling, the euro, the US dollar and 100 Japanese yen since 2003. The values used in the figure are quarterly and the method of calculating these

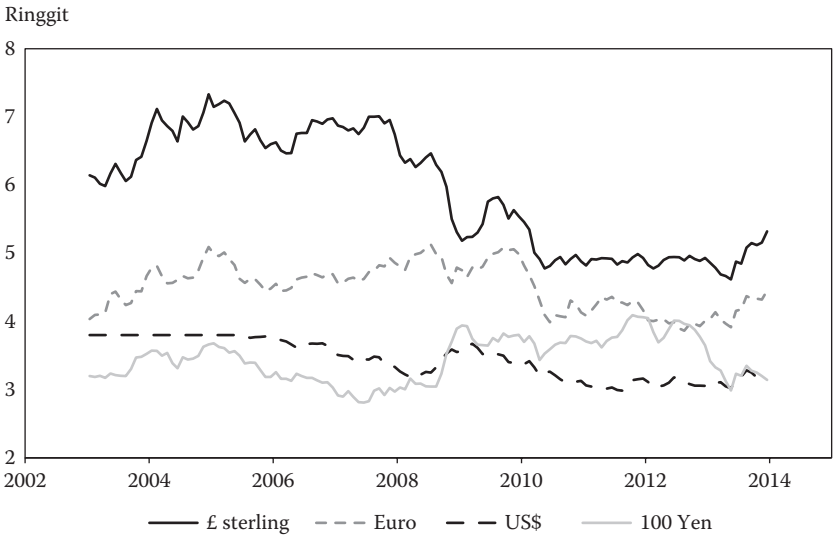


Figure 10.1 The Malaysian ringgit against sterling, euro, US dollar and 100 Japanese yen.

Table 10.4 Consumer price and house price index

Year	*Consumer price index*	*Change from previous year (%)*	*House price index*	*Change from previous year (%)*
2003	83.9	–	107.9	–
2004	85.1	1.5	113.2	4.9
2005	87.7	3.0	115.9	2.4
2006	90.9	3.5	118.4	2.2
2007	92.7	2.0	123.9	4.6
2008	97.8	5.5	129.9	4.8
2009	98.3	0.6	131.9	1.5
2010	100.0	1.7	140.7	6.7
2011	103.2	3.2	154.6	9.9
2012	104.8	1.6	172.8	11.8
2013	107.0[a]	1.9	194.4[b]	12.5

Source: Department of Statistics, Malaysia & The Malaysia House Price Index, Valuation & Property Service Department.

[a] December to November 2013 only.
[b] 3rd Quarter 2014 preliminary data only.

is described and general guidance on the interpretation of the figure are provided in Chapter 2. The average exchange rate in the fourth quarter of 2013 was RM 5.20 to pound sterling, RM 4.37 to euro, RM 3.21 to US dollar and RM 3.20 to 100 Japanese yen.

Price inflation

Table 10.4 shows consumer price and house price inflation in Malaysia since 2003.

USEFUL ADDRESSES

Public Organisations

Construction Industry Development Board Malaysia
Tingkat 10, No. 45, Menara Dato' Onn
Pusat Dagangan Dunia Putra
Jalan Tun Ismail
50480 Kuala Lumpur
Tel: (60) 3 4047 7000
Fax: (60) 3 4047 7070
Website: www.cidb.gov.my

Department of National Housing
Jabatan Perumahan Negara
Kementerian Perumahan dan Kerajaan Tempatan
Aras 30-38, No. 51, Persiaran Perdana
Presint 4, 62100, Putrajaya
Tel: (60) 3 8000 8000
Fax: (60) 3 8891 4088
E-mail: kpjpn@kpkt.gov.my
Website: http://ehome.kpkt.gov.my

The Local Authority
Pihak Berkuasa Tempatan
(in every state there is a Local Authority)

The Malaysian Highway Authority
Lembaga Lebuhraya Malaysia
Wisma Lebuhraya
KM 6 Jalan Serdang - Kajang
43000 Kajang, Selangor Darul Ehsan
Tel: (60) 3 8738 3000/8737 3000
Fax: (60) 3 8737 3555
E-mail: aduan@llm.gov.my
Website: www.llm.gov.my

The Ministry of Science, Technology and Innovation
Kementerian Sains, Teknologi dan Inovasi
Aras 1-7, Block C4 & C5, Kompleks C
Federal Government Administrative Centre
62662 Putrajaya, Wilayah Persekutuan
Tel: (60) 3 8885 8000
Fax: (60) 3 8888 9070
E-mail: info@mosti.gov.my
Website: www.mosti.gov.my

The Ministry of Works Malaysia
Kementerian Kerjaraya Malaysia
Blok B, Tingkat 6, Kompleks Kerja Raya
Jalan Sultan Salahuddin
50580 Kuala Lumpur
Tel: (60) 3 8000 8000
Fax: (60) 3 2711 1101
E-mail: pro@kkr.gov.my
Website: www.kkr.gov.my

The Ministry of Urban Wellbeing, Housing and Local Government
Kementerian Perumahan dan Kerajaan Tempatan
Aras 2-38, No. 51, Persiaran Perdana
Presint 4, 62100, Putrajaya
Tel: (60) 3 8000 8000
Fax: (60) 3 8891 3182
Website: www.kpkt.gov.my

Contractor Services Centre
Pusat Khidmat Kontraktor
Kementerian Kerja Raya Malaysia
Aras 5, Blok Menara, Menara Usahawan
No. 18 Persiaran Perdana, Presint 2
62652 Putrajaya
Tel: (60) 3 8880 5200
Fax: (60) 3 8880 5204/5300
E-mail: pkkfeedback@kkr.gov.my
Website: pkk.kkr.gov.my

SIRIM Berhad
No. 1 Persiaran Dato' Menteri
Seksyen 2, Peti Surat 7035
40700 Shah Alam, Selangor Darul Ehsan
Tel: (60) 3 5544 6000
Fax: (60) 3 5544 6694
E-mail: web@sirim.my
Website: www.sirim.my

Town and Country Planning Department
Jabatan Perancang Bandar dan Desa
Jabatan Perancang Department
Jalan Cenderasari
50646 Kuala Lumpur
Tel: (60) 3 2698 9211
Fax: (60) 3 2692 9994
E-mail: townplan@gov.my
Website: www.townplan.gov.my

Urban Development Authority (UDA)
UDA Holdings Berhad
Menara Bukit Bintang
Lot 111 Jalan Bukit Bintang
55100 Kuala Lumpur
Tel: (60) 3 2730 8500

Fax: (60) 3 2713 8500
Website: www.uda.com.my

Trade and Professional Organisations

Association of Consulting Engineers Malaysia
63-2 & 65-2 Medan Setia 1
Damansara Heights
50490 Kuala Lumpur
Tel: (60) 3 2095 0031/0079/0158
Fax: (60) 3 2095 3499
E-mail: sec@acem.com.my
Website: www.acem.com.my

Board of Architects Malaysia
Lembaga Akitek Malaysia
Tingkat 17, Block F, Ibu Pejabat JKR
Jalan Sultan Salahuddin
50582 Kuala Lumpur
Tel: (60) 3 2698 2878/(60) 3 2610 7087
Fax: (60) 3 2693 6881
E-mail: info@lam.gov.my
Website: www.lam.gov.my

Institute of Architects Malaysia
Wisma Bandar
Level 11, No.18 Jalan Tuanku Abdul Rahman
50100, Kuala Lumpur
Tel: (60) 3 2693 4182
Fax: (60) 3 2692 8782
E-mail: info@pam.org.my
Website: www.pam.org.my

Institution of Engineers Malaysia
Bangunan Ingenieur
Lots 60/62, Jalan 52/4
Peti Surat 223 (Jalan Sultan)
46720 Petaling Jaya, Selangor Darul Ehsan
Tel: (60) 3 7968 4001/4002
Fax: (60) 3 7957 7678
E-mail: sec@iem.org.my
Website: www.myiem.org.my

Royal Institution of Surveyors Malaysia
3rd Floor Bangunan Juruukur

64-66 Jalan 52/4
46200 Petaling Jaya
Selangor Darul Ehsan
Tel: (60) 3 7955 1773/(60) 3 7956 9728
Fax: (60) 3 7955 0253
E-mail: secretariat@ism.org.my
Website: www.rism.org.my

Master Builders Association Malaysia
No. 2 Jalan 2/109E
Desa Business Park
58100 Kuala Lumpur
Tel: (60) 3 7984 8636
Fax: (60) 3 7982 6811
E-mail: ed@mbam.org.my
Website: www.mbam.org.my

Chapter 11

Myanmar

All data relate to 2013 unless otherwise indicated.

Population	
Population	52.80 mn
Urban population	33.22%
Population under 15	25.28%
Population 65 and over	5.16%
Average annual growth rate (2012)	0.76%
Geography	
Land area	676,590 km^2
Agricultural area	19.22%
Capital city	Nay Pyi Daw
Commercial city	Yangon
Population of commercial city	6 mn
Economy	
Monetary unit	Kyat (MMK)
Exchange rate (fourth quarter of 2013) to:	
The pound sterling	MMK 1,555
The US dollar	MMK 961
The euro	MMK 1,308
The yen ×100	MMK 958
Average annual inflation (1998–2007)	4.63%
Inflation rate	3.50%
Gross domestic product (GDP)	MMK 51,727 bn
GDP per capital	MMK 848,325
Average annual real change in GDP (1998–2007)	9.28%
Private consumption as a proportion of GDP	70.92%
Public consumption as a proportion of GDP	70.92%
Investment as a proportion of GDP (2010)	22.70%
Construction	
Gross value of construction output	–
Net value of construction output (2012)	MMK 2,515.9 bn
Net value of construction output as a proportion of GDP (2012)	4.8%

Source: World Bank, Asia Development Bank, OANDA.

THE CONSTRUCTION INDUSTRY

Construction output

The net output of construction industry in 2012 was kyats 2,515.9 billion, or 4.8% GDP.

Figure 11.1 shows the net output of construction industry at current price for the last 10 years.

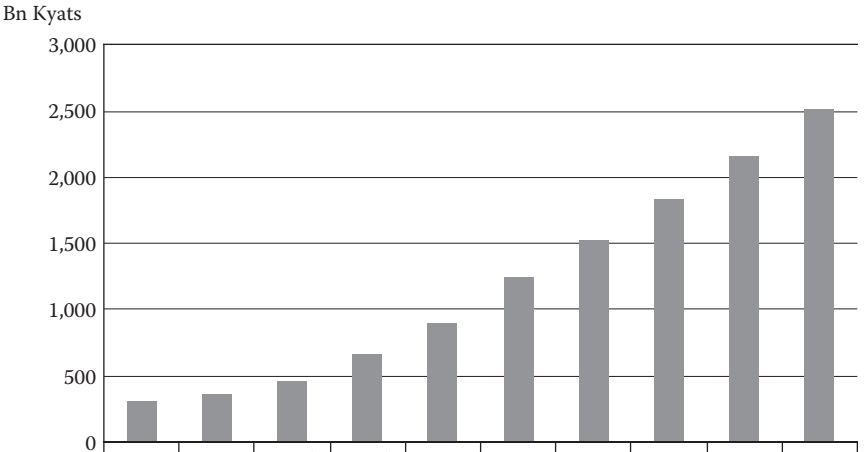
Characteristics and structure of the industry

The economy grew at 6.5% in 2012/2013. The main drivers of growth were increased gas production, services, construction, foreign direct investments and strong commodity exports. However, the contribution of construction industry to the total GDP was not significant compared with other industries.

Three special economic zones (SEZs) are being developed in Myanmar; namely Dawei SEZ, Kyauk Phyu SEZ and Thilawa SEZ to serve as an entry point for foreign companies seeking to invest in Myanmar, thereby contributing to the Country's industrialisation and economic development.

Dawei Special Economic Zone

Located at Southern part of the Country in the Tanintharyi Region.



	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Bn Kyats	303.50	356.80	461.70	652.00	893.70	1,236.1	1,518.3	1,839.3	2,165.8	2,515.9

Figure 11.1 Construction output at current prices (GDP).

Kyauk Phyu Special Economic Zone
Located at Western part of the Country in the Rakhine State.

Thilawa Special Economic Zone
It covers about 2,400 hectares of land and is located approximately 20 km south of Yangon.

In addition, the Government is establishing some 25 industrial zones across the Country to boost local industries and generate economic activities.

For the past 20 years, local contractors had been involved mainly in low-rise construction works. However, with the recent increase in demand for high-rise Grade A building, the local contractors are now facing challenges, due to lack of experience, in carrying out such construction works.

As a result, foreign contractors are stepping into the vacuum, particularly from Singapore, Korea, China and Thailand. Inevitably, this has pushed up the construction cost as foreign contractors are pricing with an inclusion of the risk factors of working in a frontier economy. Tender prices are therefore 20%–30% higher than those in Thailand, even though labour costs are relatively cheap in Myanmar.

Clients and finance

Under the National Development Plan which covers the country's economic and social development until 2030, it focuses on several priority areas as listed below:

- Tourism
- Electricity and power generation
- Communication and transport
- Mining and natural resources
- Property development

Hence, the construction industry is expected to grow progressively in both the public and private sectors.

The Ministry of Construction is encouraging to promote private sector participation in the infrastructure development on the basis of built–operate–transfer (BOT) system and joint venture for the construction of roads, inland cargo depot, ports and airport.

Construction activities from the private sectors has increased since 2010, mainly on hotel renovations, mixed use development comprising of office, retail, service apartments, hotel and the like.

Selection of design consultants

For those large-scale projects, international consultants have been actively involved in basic design stage and local consultants will involve after the preliminary basic design stage.

For those small-scale projects, developers normally select their design consultants based on their experience and fees from local design team.

Contractual arrangements

For private sector, there are no specific Forms of Contract to be used in Myanmar. The most common type of contract is the simplified version of the Standard Form of Contract published by Joint Contracts Tribunal (JCT) and FIDIC.

Development control and standards

Business operation in Myanmar can be carried out through one of the following business organisations:

- Partnerships
- Companies limited by shares, that is, joint venture companies, local companies, foreign companies
- Branch or representative office of a foreign company
- Associations not for profit

In accordance to the Foreign Investment Law, foreign investment in Myanmar can be carried out from the following:

- 100% foreign capital contributed by the foreigner except for the businesses prescribed with the notification issued by the Myanmar Investment Commission.
- Joint venture with the agreed foreign capital ratio and national capital ratio by the Joint Venture Agreement which is concluded between the foreigner and citizen or the Government departments and organisations.
- Various forms of co-operation system between Government and private including BOT system, and any other form according to the Joint Venture Agreement.

CONSTRUCTION COST DATA

Cost of labour

The figures that follow are typical of labour costs in the Yangon area as at the fourth quarter of 2013.

	Wage rate (per day) US$	*Number of hours worked per year*
Site operatives		
Bricklayer	3.00–6.00	2,336
Carpenter	3.00–6.00	2,336
Plumber	3.00–6.00	2,336
Electrician	3.00–6.00	2,336
Structural steel erector	3.00–6.00	2,336
Site supervision	*(per month)*	
General foreman	100.00–300.00	2,336
Trades foreman	100.00–300.00	2,336
Clerk of works	100.00–300.00	2,336
Resident engineer	100.00–300.00	2,336
Contractors' personnel		
Site manager	400.00–600.00	2,336
Site engineer	300.00–400.00	2,336
Site quantity surveyor	200.00–300.00	2,336
Consultants' personnel		
Senior architect	500.00–700.00	2,336
Senior engineer	500.00–700.00	2,336
Senior surveyor	500.00–700.00	2,336

Cost of materials

The figures that follow are the costs of main construction materials, delivered to site in the Yangon area, as incurred by contractors in the fourth quarter of 2013. These assume that the materials would be in quantities as required for a medium-sized construction project and that the location of the works would be neither constrained nor remote. All the rates in this section exclude tax.

	Unit	*Cost US$*
Cement and aggregate		
Ordinary Portland cement in 50 kg bags	tonne	6.03
Coarse aggregates for concrete	m^3	54.07
Fine aggregates for concrete	m^3	2.35
Ready mixed concrete (mix Grade 30)	m^3	97.01
Ready mixed concrete (mix Grade 20)	m^3	83.30

Continued

	Unit	*Cost US$*
Steel		
Mild steel reinforcement	tonne	659.79
High tensile steel reinforcement	tonne	659.79
Structural steel sections	tonne	921.65
Bricks and blocks		
Common bricks (215 × 102.5 × 65 mm)	1,000	82.47
Good-quality facing bricks (215 × 102.5 × 65 mm)	1,000	170.10
Hollow concrete blocks (390 × 105 × 65 mm)	1,000	–
Precast concrete cladding units with exposed aggregate finish	m	–
Timber and insulation		
Softwood for carpentry	m	–
Softwood for joinery	m	–
Hardwood for joinery	m	–
Exterior quality plywood (20 mm)	m	–
Plywood for interior joinery (4 mm)	m	–
Plywood for interior joinery (20 mm)	m	–
Softwood strip flooring (19 mm)	m	–
Softwood internal door complete with frames and ironmongery	no	–
Glass and ceramics		
Float glass (10 mm)	m^2	12.78
Plaster and paint		
Good-quality ceramic wall tiles (300 × 300 × 8 mm)	m^2	10.31
Plaster in 50 kg bags	tonne	–
Plasterboard (13 mm thick) – gypsum	m^2	14.74
Emulsion paint in 5 litre tins	gallon	40.52
Gloss oil paint in 5 litre tins	gallon	61.86
Tiles and paviors		
Clay floor tiles (100 × 200 × 8 mm)	no	1.41
Vinyl floor tiles (300 × 230 × 2.0 mm)	no	1.39
Precast concrete paving slabs (500 × 500 × 50 mm)	no	0.88
Clay roof tiles	no	1.85
Precast concrete roof tiles (420 × 330 mm)	m	1.42
Drainage		
WC suite complete (medium quality)	no	391.75
Lavatory basin complete (medium quality)	no	154.64
100 mm diameter PVC drain pipes	m	4.96
150 mm diameter cast iron drain pipes	m	11.76

Unit rates

The descriptions that follow are generally shortened versions of standard descriptions listed in full in Chapter 19. Where an item has a two digit reference number (e.g. 05 or 33), this relates to the full description against that number in Chapter 19. Where an item has an alphabetic suffix (e.g. 12A or 34B) this indicates that the standard description has been modified. Where a modification is major the complete modified description is included here and the standard description should be ignored; where a modification is minor (e.g. the insertion of a named hardwood) the shortened description has been modified here but, in general, the full description in Chapter 19 prevails.

The unit rates below are for main work items on a typical construction project in the Yangon area in the fourth quarter of 2013. The rates include all necessary labour, materials and equipment. Allowance of 15% to cover preliminaries and general items and 10% to cover contractor's profit and overheads have been included in the unit rates. All the rates in this section exclude tax.

		Unit	*Rate US$*
Excavation			
01	Mechanical excavation of foundation trenches	m^3	8.78
02	Hardcore filling making up levels	m^3	15.00
Concrete work			
04	Plain *in situ* concrete in strip foundations in trenches	m^3	144.64
05	Reinforced *in situ* concrete in beds	m^3	148.00
06	Reinforced *in situ* concrete in walls	m^3	148.00
07	Reinforced *in situ* concrete in suspended floors or roof slabs	m^3	148.00
08	Reinforced *in situ* concrete in columns	m^3	148.00
09	Reinforced *in situ* concrete in isolated beams	m^3	148.00
Formwork			
11	Softwood formwork to concrete walls	m^2	29.32
12	Softwood formwork to concrete columns	m^2	29.32
13	Softwood formwork to horizontal soffits of slabs	m^2	29.32
Reinforcement			
14	Reinforcement in concrete walls	tonne	1,020.00
15	Reinforcement in suspended concrete slabs	tonne	1,020.00
Steelwork			
17	Fabricate, supply and erect steel-framed structure	tonne	2,060.00

Continued

		Unit	*Rate US$*
Brickwork and blockwork			
21A	Solid (perforated) concrete blocks (70 mm thick)	m^2	17.60
22A	Local one brick wall	m^2	35.00
Roofing			
24A	Concrete interlocking roof tiles 430 × 380 mm	m^2	–
Woodwork and metalwork			
34A	Timber plank floor	m	125.00
37A	Single leaf timber door	each	613.60
38A	Single leaf steel door 1000 × 2100 mm (2 h fire-rated)	each	710.20
Plumbing			
42A	Light gauge galvanised sheet box gutter 150 × 100 mm	m	3.00
43A	PVC rainwater pipes (100 mm diameter) class 8.5	m	2.50
44A	100 mm diameter high-pressure polybutylene pipes for cold water supply	m	6.50
46A	100 mm diameter low-pressure polybutylene pipes for cold water distribution	m	6.50
47	UPVC soil and vent pipes (100 mm diameter)	m	2.50
48	White vitreous China WC suite	each	15.00
49	White vitreous China lavatory basin	each	12.00
50	Glazed fireclay shower tray	each	1.50
51	Stainless steel single bowl sink and double drainer	each	9.00
Electrical work			
52	PVC insulated and copper sheathed cable	m	–
53A	10 amp unswitched socket outlet	each	–
54	Flush-mounted 20 amp, 1-way light switch	each	–
Finishings			
55A	Skim coat to wall	m^2	170.00
56A	Homogeneous tiles to floor	m^2	230.00
60A	9 mm thick gypsum board to ceiling	m^2	420.00
Glazing			
61A	Full height laminated glass	m^2	625.00
Painting			
62	Emulsion on plaster walls	m^2	8.00
63	Oil paint on timber	m^2	10.00

Approximate estimating

The building costs per unit area that follow are averages incurred by building clients for typical buildings in the Yangon area as at the fourth quarter

of 2013. They are based upon the total floor area of all storeys, measured between external walls and without deduction for internal walls.

Approximate estimating costs generally include mechanical and electrical installations but exclude furniture, loose or special equipment, and external works; they also exclude fees for professional services. The costs shown are for specifications and standards appropriate to Myanmar and this should be borne in mind when attempting comparisons with similarly described building types in other countries. A discussion of this issue is included in Chapter 2. Comparative data for countries covered in this publication, including construction cost data, are presented in Part III.

Approximate estimating costs must be treated with caution; they cannot provide more than a rough guide to the probable cost of building. All the rates in this section exclude tax.

	Cost m² US$	*Cost ft² US$*
Administrative and commercial buildings		
Medium/high-rise office, average standard	900–1,200	84–110
High-rise office, prestige quality	1,200–1,800	110–170
Out-of-town shopping centre, average standard	850–1,500	80–140
Retail malls, high end	1,100–1,250	100–115
Residential buildings		
Apartments, high rise, average standard	800–1,000	75–90
Apartments, high rise, high end	1,000–1,300	90–120
Luxury hotel	1,950–2,500	180–230

EXCHANGE RATES

On 1 April 2012, the Central Bank of Myanmar announced the reforming of currency exchange system by adopting the "managed floating exchange rate" system; a system which will be driven by supply and demand market forces. This has put an end to a fixed-rate currency system which had been in place for the past 35 years. Under the old system, the country's official currency was pegged to the International Monetary Fund's special drawings right, with 1 USD equalling to 6.2–6.7 kyat. This old complex system with its many restrictions gives rise to multiple exchange rates and extensive black market currency trading. With the reformation, the Government aims to unify the exchange rate and eliminates the black market.

Arising from the above new changes, Figure 11.2 plots the movement of the Myanmar Kyat against the sterling, the euro, the US dollar and 100 Japanese yen from April 2012. The values used in the figure are quarterly and the method of calculating these is described and general guidance on the interpretation of the figure are provided in Chapter 2. The average

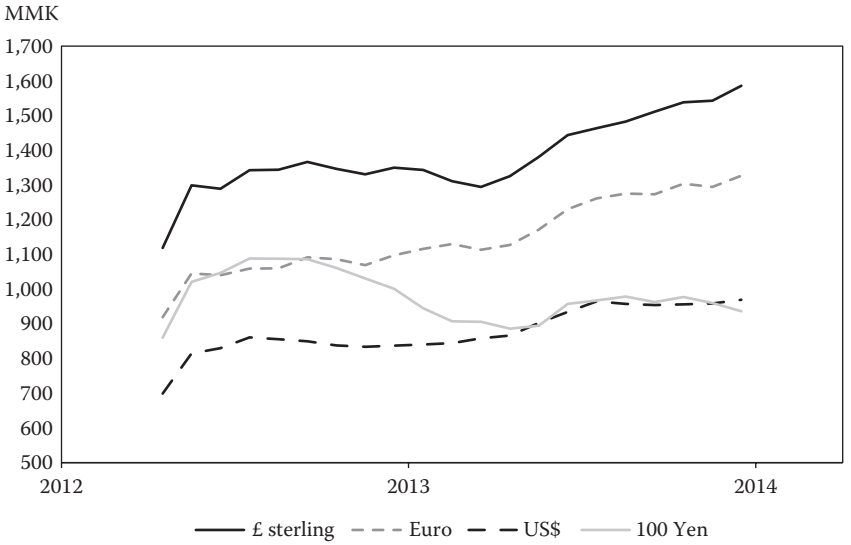


Figure 11.2 The Myanmar kyat against sterling, euro, US dollar and 100 Japanese yen.

exchange rate in the fourth quarter of 2013 was MMK 1,555 to pound sterling, MMK 1,308 to euro, MMK 961 to US dollar and MMK 958 to 100 Japanese yen.

USEFUL ADDRESSES

Public Organisations

Ministry of National Planning and Economic Development
Building No. (1), Nay Pyi Taw
The Republic of the Union of Myanmar
Tel: (9567) 407013
Fax: (9567) 407004
Website: https://www.mnped.gov.mm

Ministry of Commerce
Building No. (3), Nay Pyi Taw
The Republic of the Union of Myanmar
Tel: (9567) 408002
Fax: (9567) 408004
E-mail: mochmo@moc.gov.mm/mocdhmo@moc.gov.mm
Website: www.commerce.gov.mm

Ministry of Construction
Building No. (11), Nay Pyi Taw
The Republic of the Union of Myanmar
Tel: (9567) 407584
Fax: (9567) 407540
Website: http://ministryofconstruction.org/index.php/?page_id=7

Myanmar Construction Entrepreneurs Association
Than Thu Mar Road, Corner of Thuwanna Road
Thinqangyun Tsp., Yangon
Tel: 95-1-579547, 560725
E-mail: inquiry@mceamyanmar.com
Website: www.mceamyanmar.com

Chapter 12

Philippines

LANGDON & SEAH PHILIPPINES INC

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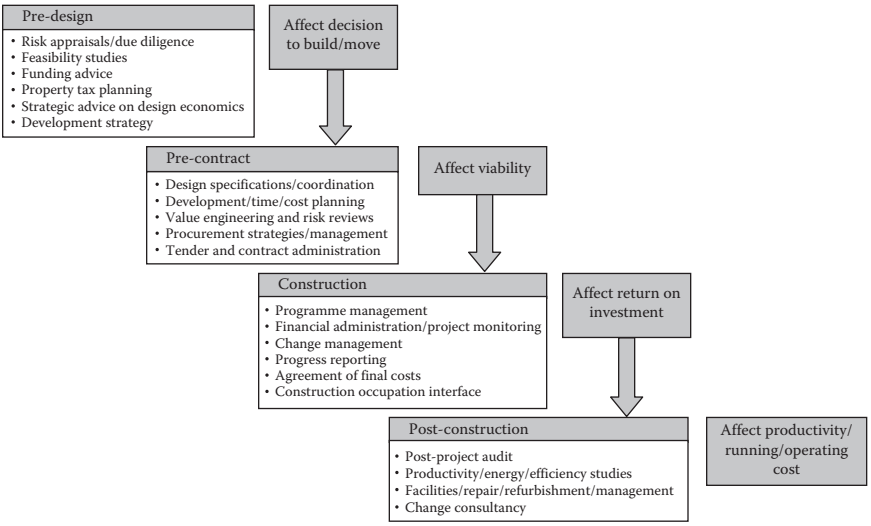
TYPICAL PROJECT STAGES, INTEGRATED SERVICES AND THEIR EFFECT



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All data relate to 2013 unless otherwise indicated.

Population	
Population 2010	92.33 mn
Urban population 2010	66.40%
Population under 15	33.26%
Population 15–64	62.13%
Population 65 and over	4.33%
Average annual growth rate (2000–2010)	1.90%
Geography	
Land area	300,000 km^2
Agricultural area	45%
Capital city	Manila
Population of capital city	1.65 mn
Economy	
Monetary unit	Philippines peso (Php)
Exchange rate (average fourth quarter 2013) to:	
The pound sterling	Php 69.85
The US dollar	Php 43.38
The euro	Php 58.82
The yen × 100	Php 43.85
Average annual inflation (2000–2013)	4.5%
Inflation rate (2013 annual average)	3.0%
Gross domestic product (GDP)	Php 11,548.2 bn
GDP per capita	Php 117,612
Average annual real change in GDP (1998–2013)	4.5%
Private consumption[a] as a proportion of GDP (Q4 2013) (real)	73.5%
Public consumption[b] as a proportion of GDP (Q4 2013) (real)	7.3%
Investment[c] as a proportion of GDP (Q4 2013) (real)	22.6%
Construction	
Gross value of construction output	Php 913.6 bn
Net value of construction output	Php 382.8 bn
Net value of construction output as a proportion of GDP	3.3%

Source: National Statistics Office, National Statistical Coordination Board.

[a] New term – Household final consumption expenditure from the 2008 System of National Accounts (SNA).
[b] New term – Government Final Consumption Expenditure from the 2008 SNA.
[c] Technical term – Capital formation from the 2008 SNA.

THE CONSTRUCTION INDUSTRY

Construction output

The Philippines' gross domestic product (GDP) grew by 6.5% in the fourth quarter of 2013 over the same quarter of the previous year. The growth was driven by the services sector which accounts for 57% of total GDP. Within services, the most important segments are: trade, repair of motor vehicles and household goods (17%); real estate, renting and business activities (11%); transport, storage and communication (8%); financial services (7%) and public administration, defense and social security (4%).

Meanwhile, industry accounts for 31% of GDP. Within industry, the most important segments are manufacturing (22%) and construction (5%). Agriculture contributes the remaining 12% of GDP. All these activities paved the way for the annual GDP to post a growth of 7.2%.

The robust economic environment, coupled with the sustained growth of key property demand drivers and positive investor sentiment, supported the continued growth of the property market (commercial office, residential, hotel, retail and industrial), particularly in Metro Manila, in 2013. As of Q3, preliminary results show total value of construction projects reached Php 71.4 billion, up by 11% (Php 64.3 billion) over the same period in 2012.

More than half or 51.7% (Php 36.9 billion) of the total value of construction was spent for new residential-type buildings. Meanwhile, non-residential construction amounted to 41.6% (Php 29.7 billion) of the total value of construction. The rest of the construction projects were allotted for additions, alterations and repairs of existing structures and consisted of 6.7% (Php 4.8 billion) of the total value of construction.

The Philippines' economy is expected to remain strong in 2014, especially now that the outlook on the global economy is becoming more favourable and as the domestic economy remains robust. The industry sector, in particular, is in a very good position to take advantage of wider export markets, as the government continues to implement reforms to reduce the cost of doing business in the country. The construction of major infrastructure projects, especially in the transport sector, is expected to add fuel to the growth this year and beyond.

A breakdown of new building starts is shown in Table 12.1 for the year 2011 and 2012.

The regional distribution of net value of construction as of 2010 in relation to the distribution of population (as of May 2010)* is shown in Table 12.2.

The regions with the greatest construction activity – Calabarzon, National Capital Region and Central Luzon – contributed to 52% of new construction projects in 2010. This was closely followed by region VII

* Official figure of the National Statistics Office.

Table 12.1 Value of new building starts, 2011 and 2012

	2011		*2012*	
Type of work	*Php billion*	*% of total*	*Php billion*	*% of total*
Residential	100.2	52.8	125.8	52.9
Commercial	58.5	30.8	67.5	28.4
Industrial	12.5	6.6	19.2	8.1
Institutional	15.2	8.0	20.6	8.7
Agricultural	1.5	0.8	3.1	1.3
Others	2.0	1.1	1.4	0.6
Total	189.9	100.0	237.6	100.0

Source: National Statistics Office Website, Construction Industry, Construction Statistics from Approved Building Permits.

Table 12.2 Regional distribution of new construction projects compared to population

Region		*Population (2010 %)*	*Construction (2010 %)*
National Capital Region (NCR Metro Manila)		12.84	12.9
CAR	Cordillera Administrative Region	1.75	1.0
I	Ilocos Region	5.14	5.9
II	Cagayan Valley	3.50	2.1
III	Central Luzon	10.98	12.8
IVA	Calabarzon	13.66	25.9
IVB	Mimaropa	2.97	1.9
V	Bicol Region	5.87	1.8
VI	Western Visayas	7.69	3.6
VII	Central Visayas	7.36	11.5
VIII	Eastern Visayas	4.44	1.9
IX	Zamboanga Peninsula	3.69	1.6
X	Northern Mindanao	4.65	5.6
XI	Davao Region	4.84	7.0
XII	Soccsksargen	4.45	1.9
XIII	Caraga	2.63	2.3
ARMM	Autonomous Region in Muslim Mindanao	3.53	0.2
Total		100	100

Source: National Statistics Office Website, Population and Housing and Construction Industry.

(Central Visayas) which has been seeing an increase in construction spending in recent years.

Characteristics and structure of the industry

All construction companies are required to obtain a licence from the Philippine Contractors Accreditation Board (PCAB) before they are

allowed to undertake any work. There are two types of PCAB Contractor's Licence:

- *Regular licence:* This is issued to construction firms (sole proprietorships, partnerships or corporations) with at least 60% Filipino equity participation and incorporated under Philippine laws.
- *Special licence:* This is issued to a joint venture, consortium, foreign contractor or a project owner for the construction of a specific project.

Licensed contractors are broadly classified under General Building, General Engineering and Specialty Contractors. They are also categorised by their financial worth. The PCAB categories are shown in Table 12.3.

Small contractors (categories C, D and trade) form the largest group making up 59.2% of the total licensed contractors. The number of large contractors (categories AAA and AA) has been steadily increasing and as of 2013, they comprise 6.1% of the total licensed contractors in 2013.

The larger general companies are shown in Table 12.4.

Selection of design consultants

Generally, professional consultants are appointed directly by the client although sometimes they are engaged by another consultant either through referrals or by competition.

In the private and public sector, price is the most important criterion followed by track record, personal contacts and recommendations. Table 12.5 sets out the indicative range of professional fees reflective of the current industry practice. It is expressed as a percentage of the total project cost.

Table 12.3 Number of licensed contractors by category, 2013–2014

Category	*Minimum capital*	*Number of licensed contractors*
AAA	Php90 million	248
AA	Php45 million	118
A	Php9 million	761
B	Php4.5 million	1,319
C	Php3.0 million	739
D	Php0.9 million	2,357
Trade	Php0.045 million	458
Total		6,000

Source: Philippine Contractors Accreditation Board (PCAB) as of 6 January 2014.

Table 12.4 Major construction firms in the Philippines

Major contractors	*Sales[a] (in Php'000)*	*Main work/types*
D.M. Consunji, Inc.	10,649,834	General building and engineering
Makati Development Corporation	9,699,579	General building and engineering
EEI Corporation	5,488,761	General building and engineering
Megawide Construction Corp.	4,540,680	General building and engineering
DDT Konstract, Inc.	4,182,861	General building and engineering
Hanjin Heavy Industries and Construction Co., Ltd.	3,608,944	General building and engineering
MTD Construction (Philippines), Inc.	3,231,154	General building and engineering
Hilmarc's Construction Corporation	3,179,862	General building and engineering
Monolith Construction & Development Corporation	3,054,939	General building and engineering
Toyo Construction Co., Ltd. (Japanese Company)	2,807,660	General building and engineering
Atlantic Gulf and Pacific Company of Manila, Inc.	2,716,031	General building and engineering
New San Jose Builders, Inc.	2,511,740	General building and engineering
SMCC Philippines, Inc.	2,350,993	General building and engineering
Cavite Ideal International Construction and Development Corporation	2,268,077	General building and engineering
Hi-Tone Construction and Development Corporation	2,094,734	General building and engineering

Source: CIBI Information; Securities and Exchange Commission.

[a] Sales as of 2010 financials; ranking as of 2011.

Table 12.5 Scale of professional fees

Professional consultants	*Industry practice %*
Architect	3.0–6.0
Structural engineer	0.5–0.6
Mechanical engineer	0.1–0.3
Electrical engineer	0.1–0.3
Sanitary and plumbing engineer	0.1–0.3
Fire and safety engineer	0.1–0.3
Project manager	1.0–3.0
Construction manager	1.0–2.0
Quantity surveyor	0.5–1.0

Contractual arrangements

Most clients commission their own design by appointing a separate planning or architectural firm and invite contractors to bid for construction. Design-and-build is seldom used, but is popular for small-scale projects such as housing projects. In recent years, management contracting has been adopted extensively and is fast gaining popularity in the Philippines, especially for large projects.

In almost all cases, building work is undertaken by general contractors. For private sector projects, contractors are usually selected on the basis of their reputation and competency through negotiation or by competition. Public sector contracts are governed by a special law – *Presidential Decree 1594* and its Rules and Regulations. Advance payments, equivalent to 15% of the contract price, are given upon submission of an irrevocable letter of credit. Government contractors are also compensated for price fluctuations in materials, labour and equipment, if the raise exceeds 5% of the original contract price.

The principal contract documents comprise conditions of contract, general agreement, schedule of works and bills of quantities. The selected contractor normally provides all construction materials, manpower and other inputs. However, in some cases, the owner supplies certain materials. Some major contracting companies nominate subcontractors to undertake specialised works such as prestressed concrete, plumbing, electrical, mechanical and drainage.

Development control and standards

The National Housing and Land Use Regulatory Board are responsible for controlling land use and building operations in the industry. The board is responsible for issuing development permits and for ensuring that developers comply with the required standards. Guidelines and procedures for obtaining the permits are enumerated in their handbooks, *PD 957* for high-cost housing and *BP 225* for low-cost housing. The request for a permit is processed only if all requirements are met. It takes about 1–3 months before a certificate of registration and licence to sell is issued.

All new construction work in the Philippines have to comply with the provisions set out in the 2004 edition of the *National Structural Code of the Philippines* or *NSCP,* the *ACO-1989 edition*, the 2007 edition of the *National Building Code of the Philippines* and the 1985 edition of the *AISC Steel Manual*. Deviations from the codes may be allowed by the building officials, provided it is shown and verified by tests that such deviation is within the scope of the code.

The *ACI-1989* edition covers the proper design and construction of reinforced concrete buildings, and prescribes rules and regulations governing

permits, inspections, specifications, materials, concrete quality, mixing, formwork, embedded pipes, strengths and serviceability, loads, specifications and provisions for seismic design. The quality and testing of materials used in construction are covered by the *American ASTM standard specification* and the welding of reinforcement by the *American AWS standard*.

Liability

The contractor is responsible for making good any defects appearing in the materials and workmanship for a minimum period of 1 year. This is usually supported by a Guarantee Bond of a value equivalent to the contract price. Main contractors will obtain similar guarantees from their subcontractors. Disputes and claims are settled by reference to and in accordance with the provisions of the Construction Industry Arbitration Commission.

CONSTRUCTION COST DATA

Cost of labour

The figures that follow are typical of labour costs in Metro Manila as at the fourth quarter of 2013. The wage rate is the basis of an employee's income, while the cost of labour indicates the cost to a contractor of employing that employee. The difference between the two covers a variety of mandatory and voluntary contributions – a list of items which could be included is given in Chapter 2.

	Wage rate (per day) Php	*Cost of labour (per day) Php*	*Number of hours worked per year*
Site operatives			
Mason/bricklayer	466	606	2,496
Carpenter	466	606	2,496
Plumber	466	606	2,496
Electrician	466	606	2,496
Structural steel erector	466	606	2,496
HVAC installer	466	606	2,496
Semi-skilled worker	466	606	2,496
Unskilled labourer	466	606	2,496
Equipment operator	637	829	2,496
	(per month)	*(per month)*	
Watchman/security	11,000	13,200	2,400

Continued

	Wage rate (per day) Php	*Cost of labour (per day) Php*	*Number of hours worked per year*
Site supervision			
General foreman	778	1,012	2,496
Trades foreman	725	942	2,496
Clerk of works	499	649	2,496
Contractors' personnel			
Site manager	1,436	1,867	2,496
Resident engineer	778	1,012	2,496
Resident surveyor	778	1,012	2,496
Junior engineer	584	759	2,496
Junior surveyor	584	759	2,496
Planner	607	789	2,496
Consultants' personnel			
Senior architect	2,155	2,802	2,080
Senior engineer	2,155	2,802	2,080
Senior surveyor	2,155	2,802	2,080
Qualified architect	1,347	1,751	2,080
Qualified engineer	1,347	1,751	2,080
Qualified surveyor	1,347	1,751	2,080

Cost of materials

The figures that follow are the costs of main construction materials delivered to site in the Metro Manila area, as incurred by contractors in the fourth quarter of 2013. These assume that the materials would be in quantities as required for a medium-sized construction project and that the location of the works would be neither constrained nor remote. All the costs in this section exclude expanded value-added tax (VAT).

	Unit	*Cost Php*
Cement and aggregate		
Ordinary Portland cement in 40 kg bags	bag	225
Coarse aggregates for concrete	m^3	950
Fine aggregates for concrete	m^3	650
Ready mixed concrete (A: 34 MPa)	m^3	4,800
Ready mixed concrete (B: 21 MPa)	m^3	3,400
Steel		
Mild steel reinforcement	tonne	32,000

Continued

	Unit	*Cost Php*
High tensile steel reinforcement	tonne	33,300
Structural steel sections	tonne	44,000
Bricks and blocks		
Common bricks (2″ × 4″ × 8″)	1,000	11,000
Hollow concrete blocks (6″ × 8″ × 16″)	1,000	13,000
Timber and insulation		
Softwood sections for carpentry	m^3	32,000
Softwood for joinery	m^3	40,000
Hardwood for joinery	m^3	53,333
Exterior quality plywood (13 mm)	m^2	399
Plywood for interior joinery (13 mm)	m^2	329
Softwood strip flooring (10 mm)	m^2	3,200
Chipboard sheet flooring (25 mm)	m^2	833
100 mm thick quilt insulation	m^2	317
100 mm thick rigid slab insulation	m^2	1,481
Softwood internal door complete with frames and ironmongery	each	5,645
Glass and ceramics		
Float glass (6 mm)	m^2	1,022
Plaster and paint		
Good-quality ceramic wall tiles (180 × 108 mm)	m^2	416
Plaster in 20 kg bags	tonne	20,800
Plasterboard (13 mm thick)	m^2	348
Emulsion paint	gallon	545
Tiles and paviors		
Clay floor tiles (8″ × 8″ × 1″)	m^2	383
Vinyl floor tiles (300 × 300 × 3 mm)	m^2	441
Precast concrete paving slabs (400 × 185 × 50 mm)	m^2	640
Drainage		
WC suite complete	each	8,700
Lavatory basin complete	each	7,500
150 mm diameter cast iron drain pipes	m	2,800

Unit rates

The descriptions that follow are generally shortened versions of standard descriptions listed in full in Chapter 19. Where an item has a two-digit reference number (e.g. 05 or 33), this relates to the full description against that number in Chapter 19. Where an item has an alphabetic suffix (e.g. 12A or 34B), this indicates that the standard description has been modified. When a modification is major, the complete modified description will be included

here and the standard description will be ignored; when a modification is minor (e.g. the insertion of a named hardwood), the shortened description will be modified here but, in general, the full description in Chapter 19 prevails.

The unit rates that follow are for main work items on a typical construction project in the Metro Manila area in the fourth quarter of 2013. The rates include all necessary labour, materials and equipment. Allowances of 5%–10% to cover preliminary and general items and 3%–5% to cover contractors' overheads and profit have been included in the rates. All the rates in this section exclude expanded VAT.

		Unit	*Rate Php*
Excavation			
01	Mechanical excavation of foundation trenches	m^3	400
02	Hardcore filling making up levels	m^3	800
03	Earthwork support	m^2	650
Concrete work			
04	Plain *in situ* concrete in strip foundations in trenches	m^3	4,000
05	Reinforced *in situ* concrete in beds	m^3	4,500
06	Reinforced *in situ* concrete in walls	m^3	4,800
07	Reinforced *in situ* concrete in suspended floors or roof slabs	m^3	4,800
08	Reinforced *in situ* concrete in columns	m^3	5,000
09	Reinforced *in situ* concrete in isolated beams	m^3	4,800
10	Precast concrete slab (1500 × 2000 × 100)	each	6,700
Formwork			
11	Softwood formwork to concrete walls	m^2	850
12	Softwood formwork to concrete columns	m^2	850
13	Softwood formwork to horizontal soffits of slabs	m^2	900
Reinforcement			
14	Reinforcement in concrete walls	kg	45
15	Reinforcement in suspended concrete slabs	kg	48
16	Fabric reinforcement in concrete beds	m^2	200
Steelwork			
17	Fabricate, supply and erect steel framed structure	tonne	101,000
18	Framed structural steelwork in universal joist sections	tonne	90,000
19	Structural steelwork lattice roof trusses	tonne	82,000
Brickwork and blockwork			
20	Precast lightweight aggregate hollow concrete block walls	m^2	1,000
21	Solid (perforated) concrete blocks	m^2	950

Continued

		Unit	Rate Php
Roofing			
24	Concrete interlocking roof tiles 430 × 380 mm	m^2	3,000
25	Plain clay roof tiles 260 × 160 mm	m^2	1,900
28	Particle board roof coverings	m^2	1,300
29	Three layers glass-fibre-based bitumen felt roof covering	m^2	1,200
30	Bitumen-based mastic asphalt roof covering	m^2	900
31	Glass-fibre mat roof insulation 160 mm thick	m^2	1,000
32	Rigid sheet load bearing roof insulation 75 mm thick	m^2	1,800
33	Troughed galvanised steel roof cladding	m^2	850
Woodwork and metalwork			
34	Preservative-treated sawn softwood 50 × 100 mm	m	650
35	Preservative-treated sawn softwood 50 × 150 mm	m	750
36	Single-glazed casement window in hardwood, 650 × 900 mm	each	3,500
37	Two-panel glazed door in hardwood, size 850 × 2000 mm	each	18,000
38A	Solid core half hour fire resisting hardwood internal flush door, size 650 × 900 mm	each	12,000
39	Aluminium double-glazed window, size 1200 × 1200 mm	each	27,360
40	Aluminium double-glazed door, size 850 × 2100 mm	each	34,000
41	Hardwood skirtings	m	700
Plumbing			
42A	UPVC half round eaves gutter; 12″ × 8″	m	1,600
43	UPVC rainwater pipes; 4″ diameter	m	634
44A	Light gauge copper cold water tubing; 1″ diameter	m	1,627
45A	High-pressure plastic pipes for cold water supply; 4″ diameter	m	918
46A	Low-pressure plastic pipes for cold water distribution; 2″ diameter	m	450
47	UPVC soil and vent pipes; 4″ diameter	m	634
48	White vitreous china WC suite	each	10,500
Electrical work			
52	PVC insulated and copper-sheathed cable	m	3,024
53	13 amp unswitched socket outlet	each	350
54	Flush-mounted 20 amp, 1-way light switch	each	200
Finishings			
55	Two coats gypsum-based plaster on brick walls	m^2	700
56	White-glazed tiles on plaster walls	m^2	1,100
57	Red clay quarry tiles on concrete floors	m^2	2,200
58	Cement and sand screed to concrete floors	m^2	400
59	Thermoplastic floor tiles on screed	m^2	950
60	Mineral fibre tiles on concealed suspension system	m^2	1,500

Continued

		Unit	Rate Php
Glazing			
61	Glazing to wood	m^2	1,500
Painting			
62	Emulsion on plaster walls	m^2	400
63	Oil paint on timber	m^2	550

Approximate estimating

The building costs per unit area that follow are averages incurred by building clients for typical buildings in the Metro Manila area as at the fourth quarter of 2013. They are based upon the total floor area of all storeys, measured between external walls and without deduction for internal walls.

Approximate estimating costs generally include mechanical and electrical installations, but exclude furniture, loose or special equipment, and external works; they also include professional services. The costs shown are for specifications and standards appropriate to the Philippines, and this should be borne in mind when attempting comparisons with similarly described building types in other countries. A discussion in this issue is included in Chapter 2. Comparative data for countries covered in this publication, including construction cost data, are presented included in Part III.

Approximate estimating costs must be treated with caution; they cannot provide more than a rough guide to the probable cost of building. All the rates in this section exclude expanded VAT.

	Cost m^2 Php	Cost ft^2 Php
Industrial buildings		
Factories for letting	18,480	1,798
Factories for owner occupation (light industrial use)	20,580	2,002
Factories for owner occupation (heavy industrial use)	19,200	1,868
Factory/office (high tech) for letting (shell and core only)	16,500	1,605
Factory/office (high tech) for letting (ground floor shell, first floor offices)	17,300	1,683
Factory/office (high tech) for owner occupation (controlled environment, fully finished)	24,200	2,354
High tech laboratory workshop centres (air-conditioned)	29,200	2,840
Warehouses, low bay (6–8 m high) for letting (no heating)	15,500	1,508
Warehouses, low bay for owner occupation	18,200	1,770
Warehouses, high bay for owner occupation	19,500	1,897
Cold stores/refrigerated stores	32,500	3,161

Continued

	Cost m² Php	*Cost ft² Php*
Administrative and commercial buildings		
Civic offices, non-air-conditioned	26,300	2,558
Civic offices, fully air-conditioned	32,600	3,171
Offices for letting, 5–10 storeys, non-air-conditioned	27,800	2,704
Offices for letting, 5–10 storeys, air-conditioned	30,100	2,928
Offices for letting, high rise, air-conditioned	36,000	3,502
Offices for owner occupation 5–10 storeys, non-air-conditioned	34,600	3,366
Offices for owner occupation 5–10 storeys, air-conditioned	37,000	3,599
Offices for owner occupation high rise, air-conditioned	45,000	4,377
Prestige/headquarters office, 5–10 storeys, air-conditioned	47,300	4,601
Prestige/headquarters office, high rise, air-conditioned	52,000	5,058
Health and education buildings		
General hospitals (230 beds)	49,000	4,767
Teaching hospitals (100 beds)	42,800	4,163
Private hospitals (100 beds)	45,600	4,436
Health centres	26,200	2,549
Nursery schools	27,600	2,685
Primary/junior schools	29,600	2,879
University (arts) buildings	32,600	3,171
University (science) buildings	33,000	3,210
Management training centres	35,000	3,405
Recreation and arts buildings		
Theatres (>500 seats) including seating and stage equipment	62,100	6,041
Theatres (<500 seats) including seating and stage equipment	64,300	6,255
Concert halls including seating and stage equipment	85,000	8,268
Sports halls including changing and social facilities	48,700	4,737
National museums including full air-conditioning and standby generator	83,500	8,123
Local museums including air-conditioning	55,300	5,379
City centre/central libraries	41,200	4,008
Branch/local libraries	38,300	3,726
Residential buildings		
Social/economic single family housing (multiple units)	15,000	1,459
Private/mass market single family housing two-storey detached/semi-detached (multiple units)	22,000	2,140
Purpose-designed single family housing two-storey detached (single unit)	28,500	2,772
Social/economic apartment housing, low rise (no lifts)	20,100	1,955

Continued

	Cost m² Php	*Cost ft² Php*
Social/economic apartment housing, high rise (with lifts)	22,000	2,140
Private sector apartment building (standard specification)	38,200	3,716
Private sector apartment buildings (luxury)	49,200	4,786
Student/nurses halls of residence	35,200	3,424
Homes for the elderly (shared accommodation)	38,000	3,696
Hotel, 5 star, city centre	69,000	6,712
Hotel, 3 star, city/provincial	54,600	5,311
Motel	45,100	4,387

Expanded value-added tax

The standard rate of expanded value-added tax (E-VAT) is currently 12%, chargeable on general building work.

EXCHANGE RATES AND INFLATION

The combined effect of exchange rates and inflation on prices within a country and price comparisons between countries is discussed in Chapter 2.

Exchange rates

Figure 12.1 plots the movement of the Filipino peso against the sterling, the euro, the US dollar and 100 Japanese yen since 2003. The values used in the figure are quarterly and the method of calculating these is described and general guidance on the interpretation of the figure are provided in Chapter 2. The average exchange rate in the fourth quarter of 2013 was Php 69.85 to pound sterling, Php 58.82 to euro, Php 43.38 to US dollar and Php 43.85 to 100 Japanese yen.

Consumer price inflation

Table 12.6 presents consumer price inflation in the Philippines using 2006 base year.

USEFUL ADDRESSES

Public organisations

Board of Investments
Industry and Investments Building

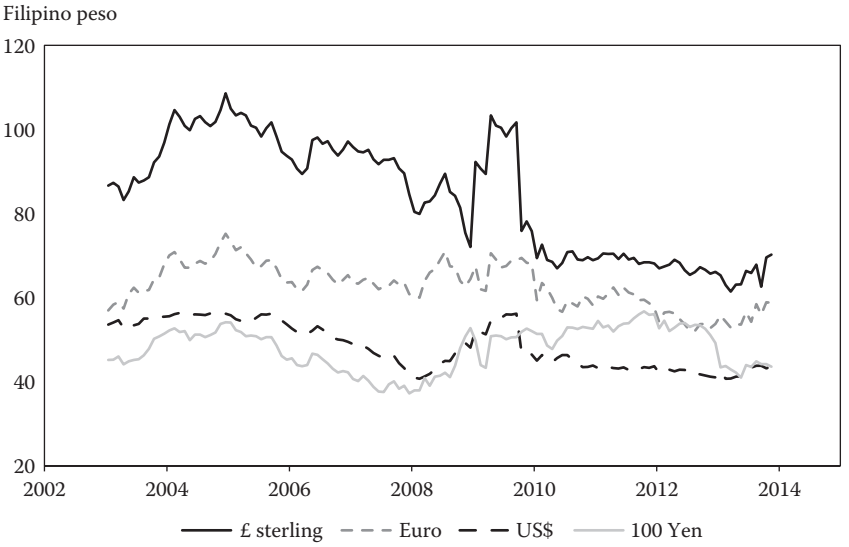

Figure 12.1 The Filipino peso against sterling, euro, US dollar and 100 Japanese yen.

Table 12.6 Consumer price inflation

Year	*Consumer price index*	*Headline inflation average %*
2000	76.7	6.7
2001	80.8	5.3
2002	83.0	2.7
2003	84.9	2.3
2004	89.0	4.8
2005	94.8	6.5
2006	100.0	5.5
2007	102.9	2.9
2008	111.4	8.3
2009	116.0	4.1
2010	120.4	3.8
2011	126.1	4.6
2012	130.1	3.2
2013	134.0	3.0

Source: National Statistical Coordination Board Website, Statistics – Prices; Central Bank of the Philippines.

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National Housing Authority (NHA)
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Fax: (63) 2 928 4566
Website: www.nha.gov.ph

National Statistics Office (NSO)
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Manila 1016
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Tel: (63) 2 716 0807/713 7074 (Administrator)
Fax: (63) 2 713 7073/715 6503
E-mail: lvcastro@nscb.gov.ph
Website: www.census.gov.ph

Philippine Contractors Accreditation Board (PCAB)
5th Floor, Executive Center Building,
369 Sen. Gil Puyat (Buendia) cor. Makati Avenue,
Makati City
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E-mail: pcabphil@yahoo.com
Website: www.dti.gov.ph

Professional Regulation Commission (PRC)
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Sampaloc, Manila
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Philippine Constructors Association (PCA)
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Chapter 13

Singapore

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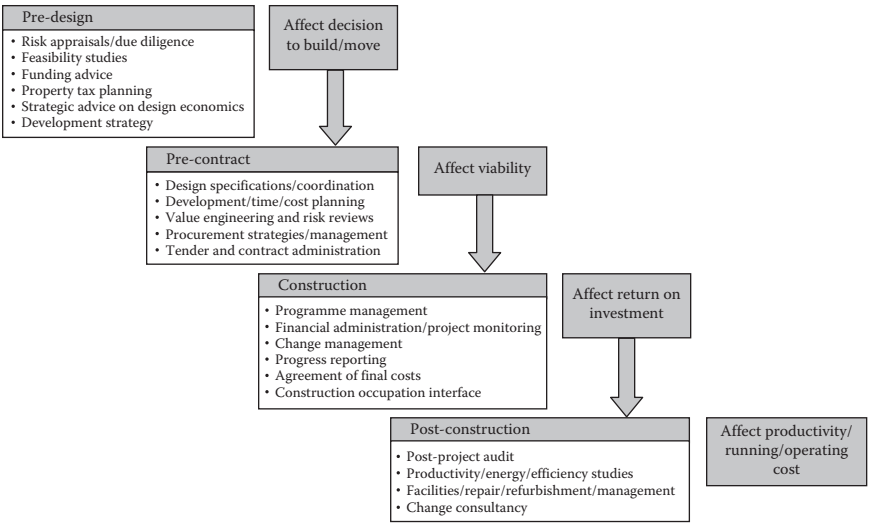

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All data relate to 2013 unless otherwise indicated.

Population	
Population	5.4 mn
Urban population	100%
Population under 15	16%
Population 65 and over	10.5%
Average annual growth rate (2010–2013)	2.1%
Geography	
Land area	716.1 km^2
Agricultural area	1%
Capital city	Singapore
Economy	
Monetary unit	Singapore dollar (S$)
Exchange rate (average fourth quarter 2013) to:	
The pound sterling	S$2.02
The US dollar	S$1.25
The euro	S$1.70
The yen × 100	S$1.25
Average annual inflation (2009–2013)	3.12%
Inflation rate	2.4%
Gross domestic product (GDP) at 2010 market prices	S$363.9 bn
GDP per capita at current market prices	S$69,050
Average annual real change in GDP (2008–2013)	4.8%
Private consumption as a proportion of GDP at 2010 market prices	35%
Public consumption as a proportion of GDP at 2010 market prices	10%
Construction	
Gross value of construction output	S$33.7 bn
Net value of construction output	S$17.2 bn
Net value of construction output as a proportion of GDP	4.7%

THE CONSTRUCTION INDUSTRY

Construction outlook

Construction demand in Singapore for the past 5 years (2009–2013) had generally maintained comparable to the national's peak volume circa S$35 billion with the exception in year 2009 and 2010.

Total construction contracts awarded in 2009 and 2010 reduced significantly due to the effects of the global financial crisis, a drop of 37% (for 2009) and 23% (for 2010) as compared to year 2008.

Fortunately, contrary to the Asian Financial Crisis in 1997/1998, which saw a recession that lasted for almost 8 years, the Singapore construction industry recovered much faster from the global financial crisis downturn.

Construction demand in year 2011 increased by 29% to S$35.5 billion as compared to the previous year. The growth mainly attributed to the ramp up of public housing projects, infrastructure (MRT) projects as well as increase in demand on private residential and industrial projects.

Following the outstanding performance in 2011, total construction demand moderated to S$30.8 billion in 2012. There was a reduction in the construction demand for public housing and civil engineering works.

Total construction demand in 2013 then rebounded by approximately 17% to S$35.8 billion, marginally exceeding the previous peak of S$35.7 billion in 2008. This was mainly due to the award of public housing developments and civil engineering works. Private sector works, on the other hand, remained relatively stable.

The above mentioned represents a brief snapshot of the Singapore's construction industry performance from 2009 to 2013.

For 2014, Building and Construction Authority (BCA) forecasts the total construction demand to be approximately between S$31 billion and S$38 billion. The public sector contributes to about 53% of the total construction demand, that is, S$17 billion to S$20 billion. Private sector demand, on the other hand, is anticipated to be approximately S$14 billion to S$18 billion.

Table 13.1 shows the value of construction contracts awarded in the public and private sectors.

As seen from the above, private sector residential projects for 2014 is anticipated to decline due to the various cooling measures implemented by the Government. Similarly, public sector residential projects are also anticipated to slow down.

Characteristics and structure of the industry

The construction industry in Singapore is supported by the BCA, a statutory board under the auspices of the Ministry of National Development (MND). BCA was established on 1 April 1999 following a merger between the Construction Industry Development Board and the Building Control Division of the Public Works Department. It has the primary role of developing and regulating the building and construction industry.

The Contractors Registry System

The Contractors Registry System (CRS) was established in 1984 to register contractors who provide construction-related goods and services to the

Table 13.1 Value of construction contracts awarded, 2010–2014 (in S$ mn)

Type of work	*2010*	*2011*	*2012*	*2013p*	*2014f (S$ bn)*
Private					
Residential	8,680.16	9,066.34	8,511.65	9,805.61	4.8–6.2
Commercial	3,059.27	4,158.54	2,887.97	3,725.39	2.6–3.7
Industrial	3,717.00	5,737.71	6,110.77	4,905.83	3.8–4.6
Institutional and others	2,727.45	637.71	1,038.50	1,095.50	2.0–2.4
Civil engineering	834.25	607.94	2,687.77	1,466.94	0.8–1.1
Total	19,018.13	20,208.24	21,236.65	20,999.27	14.0–18.0
Public					
Residential	2,806.87	6,231.72	3,334.24	6,331.00	4.3–4.9
Commercial	177.56	51.06	101.62	64.26	0.1–0.1
Industrial	1,072.69	483.21	307.64	295.38	0.7–1.2
Institutional and others	2,300.18	2,380.30	3,658.71	2,615.47	4.5–5.2
Civil engineering	2,189.16	6,133.38	2,122.57	5,534.10	7.4–8.5
Total	8,546.46	15,279.67	9,524.78	14,840.21	17.0–20.0
Total	27,564.59	35,487.91	30,761.43	35,839.48	31.0–38.0

Source: Building and Construction Authority as at 27 August 2014.

Note: *p* denotes preliminary.

f denotes forecast.

public sector. Contractors who wish to be registered with the Registry must show that they have the relevant experience, financial, technical and management capability. This includes the employment of sufficient number of full time qualified technical personnel in the relevant disciplines. There are seven major groups of registration heads, namely construction workheads (CW), construction-related workheads (CR), mechanical and electrical workheads (ME), maintenance workheads (MW), trade heads (TR), supply workheads (SY) and regulatory workheads (RW).

In June 2006, BCA adopted a credit rating system to indicate the financial standing of larger construction firms in its contractors registry. The adopted credit rating system is similar to one developed by credit and business information bureau DP Information Group to assess the financial health of companies.

However, the BCA system applies only to the larger construction companies (i.e. those in the top categories of A1, A2 and B1).

Government agencies will use the DP credit rating as an additional reference on the financial standing of the firms when evaluating public tenders.

Tendering limits for BCA registered contractors

In 2002, BCA launched a tender limit variable component (TLVC) to the tender limits of all registration grades in the CRS. TLVC is determined using the Tender Price Index (TPI) to reflect the impact of tender price movements on project value. Over the years, the TPI has moved up significantly, hence resulting in a need to adjust the tender limits of the various CRS registration grades to better reflect the fluctuations in the construction costs in the market.

In November 2007, BCA announced that the tendering limits would be adjusted once a year on the first of July. The current tendering limits shown as follows are based on the latest TLVC updated on 23 May 2014.

Construction workheads (CW01 and 02)	*A1*	*A2*	*B1*	*B2*	*C1*	*C2*	*C3*
Tendering limit (S$ million) 1 July 2013 to 30 June 2014	unlimited	85.0	40.0	13.0	4.0	1.3	0.65
Tendering limit (S$ million) 1 July 2014 to 30 June 2015	unlimited	90.0	42.0	14.0	4.2	1.4	0.70
Specialist workheads (CR,ME, MW and SY)	*Single Grade*	*L6*	*L5*	*L4*	*L3*	*L2*	*L1*
Tendering limit (S$ million) 1 July 2013 to 30 June 2014	unlimited	unlimited	13.0	6.5	4.0	1.3	0.65
Tendering limit (S$ million) 1 July 2014 to 30 June 2015	unlimited	unlimited	14.0	7.0	4.2	1.4	0.70

Source: Building and Construction Authority as on 23 May 2014.

Construction Quality Assessment System (CONQUAS)

In 1989, BCA launched the CONQUAS to provide a yardstick for the measurement of the workmanship and quality achieved in a completed building project. CONQUAS has been widely used in both the public sector and the private sector. The system sets out the standards for the various categories of work. Points are awarded for work that falls within the acceptance standards or tolerances to derive the total CONQUAS score for the building. Since 1989, more than 3,250 public and private sector projects worth S$134 billion have been assessed under CONQUAS.

As a *de facto* national quality yardstick for the industry, CONQUAS has been periodically fine-tuned to keep pace with changes in technology and quality demands of more sophisticated Singaporeans.

CONQUAS covers three main aspects of the general building works:

1. Structural works – Relates to the structural integrity and safeguard on safety.
2. Architectural works – Deals with the aesthetics of the building such as finishes and other architectural components. This is the part where the quality and standard of workmanship are most visible.
3. Mechanical and electrical (M&E) works – Concerns with the performance of selected mechanical and electrical services and installations to ensure the comfort of the building occupants.

Minimum buildable design score (B-Scores)

The legislation on buildability came into effect on 1 January 2001. Projects submitted for planning after 1 January 2001 will be affected by the legislation and are required to comply with the minimum B-Scores as stipulated in the Code of Practice on Buildability.

Over the years, the minimum B-Scores have been progressively raised.

In September 2005, all new building projects with gross floor area equal to or greater than 2000 m^2 are required to comply with the minimum B-Scores.

The minimum B-Scores requirement shall also apply to building works consisting of repairs, alterations and/or additions (A&A work) to an existing building if the building works involve construction of new floor and/or reconstruction of existing floor for which their total gross floor area is 2000 m^2 or more.

In an effort to further promote higher productivity improvement in the built environment sector, BCA has issued a circular on 1 August 2013 to encourage the adoption of more productive technologies. The Building Control (Buildability) (Amendment) Regulations 2013 came into effect on 1 September 2013.

In addition, on 31 October 2014, BCA has issued a circular to announce that the minimum B-Scores has been further raised by seven points in order to meet the needs of wider adoption of buildable designs to further raise construction productivity. The new minimum B-Scores will supersede the minimum scores for all new projects (to be effective from 1 September 2014) and those built on land sold under the Government Land Sale (GLS) Programme (to be effective from 15 October 2014) stated in BCA's earlier circular dated 1 August 2013.

The new minimum B-Scores for different building types:

- For all new projects including projects built on land sold under the GLS/Industrial GLS Programme and Public Sector Projects

Year	*From 1 November 2014*[a]		
Category of building work/development	*2,000 m² ≤ GFA < 5,000 m²*	*5,000 m² ≤ GFA < 25,000 m²*	*GFA ≥ 25,000 m²*
Residential (landed)	70	75	78
Residential (non-landed)	77	82	85
Commercial	79	84	87
Industrial	79	84	87
Schools	74	79	82
Institutional and others	70	76	79

Source: Building and Construction Authority.

[a] Based on date of planning submissions made to the Urban Redevelopment Authority (URA) except for projects built on land sold under GLS Programme which are based on date of the GLS land sold.

- For all new projects by key Government Procurement Entities (GPEs) which include Housing Development Board (HDB), Jurong Town Corporation (JTC), Ministry of Health (MOH), Ministry of Education (MOE), Ministry of Transport (MOT), Land and Transport Authority (LTA), People's Association (PA), National Environment Agency (NEA), Singapore Police Force (SPF) and Sport Singapore (SPORTSSG)

Year	*From 1 November 2014*[a]		
Category of building work/development	*2,000 m² ≤ GFA < 5,000 m²*	*5,000 m² ≤ GFA < 25,000 m²*	*GFA ≥ 25,000 m²*
Residential (landed)	73	78	81
Residential (non-landed)	80	85	88
Commercial	82	87	90
Industrial	82	87	90
Schools	77	82	85
Institutional and others	73	79	82

Source: Building and Construction Authority.

[a] Based on date of planning submissions made to the Urban Redevelopment Authority (URA).

Constructability Score (C-Scores)

To steer the construction industry towards higher level of productivity, BCA has tightened the existing Buildability Framework and mandate a new component called C-Scores. In this connection, contractors are expected to adopt more labour-efficient construction methods or technologies.

The constructability requirement would apply to all planning permissions submitted on and after 15 July 2011. This extends to all new building works and projects involving repairs and additions and alterations (A&A) works to existing buildings with GFA of 5000 m^2 or more. The C-Scores of a project is made up of three parts:

- Part A – Maximum of 60 points for structural system. Points are awarded for various methods and technologies adopted during the construction of structural works.
- Part B – Maximum of 50 points for Architectural, Mechanical, Electrical and Plumbing (AMEP) Systems. Points are awarded for various methods and technologies adopted during the construction of AMEP works.
- Part C – Maximum of 10 points for good industry practices. Points are awarded for good industry practices adopted on site to improve productivity.

BCA further issued a circular on 1 August 2013 to encourage the adoption of more productive technologies. The Building Control (Buildability) (Amendment) Regulations 2013 came into effect on 1 September 2013.

In addition, on 31 October 2014, BCA has issued a circular to announce that the minimum C-Scores has been further raised by four points in order to meet the needs of wider adoption of efficient construction technologies to further raise construction productivity. The new minimum C-Scores will supersede the minimum scores for all new projects (to be effective from 1 September 2014) and those built on land sold under the GLS Programme (to be effective from 15 October 2014) stated in BCA's earlier circular dated 1 August 2013.

The new minimum C-Scores for different building types:

- For all new projects including projects built on land sold under the GLS/Industrial GLS Programme and Public Sector Projects

Year	*From 1 November 2014*[a]	
Category of building work/development	*GFA ≥ 5,000 m^2*	*GFA ≥ 25,000 m^2*
Residential (landed) Residential (non-landed) Commercial Industrial Schools Institutional and others	47 (Min 32 points from structural system)	57 (Min 42 points from structural system)

Source: Building and Construction Authority.

[a] Based on date of planning submissions made to the Urban Redevelopment Authority (URA) except for projects built on land sold under GLS Programme, which are based on date of the GLS land sold.

- For all new projects by key Government Procurement Entities (GPEs), which includes Housing Development Board (HDB), Jurong Town Corporation (JTC), Ministry of Health (MOH), Ministry of Education (MOE), Ministry of Transport (MOT), Land and Transport Authority (LTA), People's Association (PA), National Environment Agency (NEA), Singapore Police Force (SPF) and Sport Singapore (SPORTSSG)

Year	*From 1 November 2014*[a]	
Category of building work/development	*GFA ≥ 5,000 m²*	*GFA ≥ 25,000 m²*
Residential (landed) Residential (non-landed) Commercial Industrial Schools Institutional and others	50 (Min 35 points from structural system)	60 (Min 45 points from structural system)

Source: Building and Construction Authority.

[a] Based on date of planning submissions made to the Urban Redevelopment Authority (URA).

Building and Construction Industry Security of Payment Act 2004

The Building and Construction Industry Security of Payment Act (BCISOP Act) 2004 came into force in Singapore on 1 April 2005.

The BCISOP Act was enacted to facilitate payments for construction work done or for related goods and services supplied, under a contract in the building and construction industry. The Act covers a wide spectrum of services within the construction industry related to construction work, which includes professional consultancy services.

The underlining objectives of the BCISOP Act are to

- Improve cash flow by expediting payment
- Provide a statutory entitlement to progress payments to contractors, subcontractors and suppliers for work carried out, even if no such entitlement is provided in their contract
- Provide a procedure of adjudication to claim payment, which is intended to be, a more cost and time efficient way of resolving disputes on payment claims between the parties
- Provide remedies when an adjudicated amount was not paid

The BCISOP Act provides a new regime of claim, adjudication and enforcement procedures, which include the right to suspend work for non-payment. It also renders unenforceable 'pay when paid' provisions in contracts. This benefits the subcontractors and suppliers.

The BCISOP Act is supplemented by the BCISOP Regulations 2005, where the Act confers power on the MND to set out the regulations to facilitate the implementation of the Act.

However, the BCISOP Act is not applicable to construction work, and goods and services related to residential property (defined under the Residential Property Act) that do not require approval under the BCA Building Control Act. It is also not applicable to construction work carried outside Singapore as well as goods and services supplied to construction work outside Singapore and employment contracts.

Clients and finance

Private sector projects are usually undertaken by private developers and institutions, and financed in a number of ways. This includes loans from banks and financial institutions and the developer's own funds. Public sector projects are mainly undertaken by various Government Agencies such as Housing and Development Board (HDB), Ministry of Health (MOH), Ministry of Education (MOE), and so forth.

Selection of design consultants

There are no prescribed criteria or published guidelines for the selection of design consultants in Singapore. In the public sector, a pre-qualification exercise through quality/fee methodology requiring the submission of credentials, including relevant experience, followed by interviews is usually adopted. A design competition may sometimes be held. In the private sector, the design competition method of selection is adopted on some occasions. Clients usually select the design consultants known to them or those who have a reputation for a specific type of building.

Most of the professional bodies publish fee scales though these are not mandatory and are rarely used.

Contractual arrangements

For all public sector construction projects, there are two forms of contracts that are currently in use:

- Public sector standard conditions of contract for construction works
- Public sector standard conditions of contract for design and build

Public sector contracts are generally awarded on the basis of the lowest compliant tenders submitted by contractors registered with BCA although price is sometimes not the sole criterion.

For contracts exceeding S$3 million in value, evaluation of tenders would be based on the Price Quality Method (PQM). The weightage between price

and quality will range from 60:40 to 80:20, depending on the complexity of the project. Under quality, various criteria like track record, financial capacity and safety performance would be included.

Most private sector projects use the SIA standard forms of building contract which comprise the measurement contract (for use with bills of quantities); the lump sum contract (where quantities does not form part of the contract); the minor works contract and the conditions of subcontract.

With an increasing inclination of projects adopting the design and build approach, the Real Estate Developers' Association of Singapore (REDAS) first launched a design and build form in August 2001, which was specially drafted to meet the industry's demand. This form of contract is currently in its third edition (renamed as Main Contract), July 2013.

In the private sector, contracts are awarded either through competition or by negotiation (especially during the period of high pricing and lack of contractors in the construction industry) or a combination of both.

Liability and insurance

Professional indemnity insurance is compulsory for architectural and engineering firms practising as limited companies. In the case of partnerships, it is not compulsory, although most of the large practices do hold professional indemnity insurance.

Development control and standards

The Urban Redevelopment Authority (URA) is the National Planning and Conservation Authority regulating and facilitating the physical development of Singapore. Most types of development require written planning permission but certain types are not considered material or are specifically exempted, and thus do not require planning permission. The URA has published a series of development control handbooks to guide and inform applicants of the procedures to be observed in submitting development applications.

BCA is responsible for setting and monitoring building regulations, which cover, for example, structural integrity, lighting, ventilation and thermal transmission. All building works, except those that are minor and exempted under the Schedule in the Building Control Act, will require building plan approval from the Commissioner of Building Control (CBC), BCA.

The salient features incorporating the Building Control (Amendment) Act 2007 are highlighted below:

1. *Require site supervision teams to ensure adequate supervision of structural works*
   Under this requirement, both the Qualified Person (QP) and the builder are required to provide their own supervision team. The actual number and compositions of the supervision team will depend on the

project cost as prescribed in the regulations. Appointment of supervision teams will be required for projects, where the first application for a permit is made on or after the effective date of the Act. While this supervision team does not apply to projects that had already obtained a permit earlier, QPs are nonetheless encouraged to adopt the supervision team where necessary.

2. *Strict regulation on major geotechnical works*
   The Act imposes more stringent regulation of major underground building works that have significant safety impact, in particular on the design of Earth Retaining or Stabilising Structures (ERSS) in excavations. The Act stipulates that the design of such ERSS be carried out by a registered Professional Engineer (PE) and reviewed by a registered Accredited Checker (AC). A PE is also required to supervise the construction of ERSS.

   In addition, the geotechnical aspects of major underground building works including ERSS in excavations more than 6 m deep will also require the inputs from PEs and ACs who are specialists in geotechnical engineering.

3. *Appointment of instrumentation specialist builder (ISB)*
   The developer of the building works shall appoint a specialist builder to monitor instruments, measuring pore pressures for saturated and unsaturated levels, ground water levels and ground movements or building movements, where the building works comprise wholly or partly of any underground building works.

   Underground building works generally mean the following:
   - A tunnel with a diameter or height of more than 2 m
   - Excavation with a depth of more than 6 m
   - Foundation works for buildings of 30 or more storeys high

   Any of the above case would require the appointment of an ISB, and the Act stipulates that the appointment shall be made by the Developer.

4. *Licensing of builders*
   This is a licensing scheme to set minimum standards of professionalism for general builders and six selective specialist builders whose works have significant safety impact.

   To be licensed, builders must be financially sound, have good safety records and appoint key personnel with suitable qualifications and experience to manage the firm and supervise the construction works.

   The licensing of builders came into effect on 16 December 2008. As illustrated in Figure 13.1, there are two types of licences – the General Builder licences and the Specialist Builder licence. After 16 June 2009, all builders who had been granted or to be granted a permit to carry out general building works, as well as builders carrying out work in the six selective specialists work areas must possess a licence issued by the CBC.

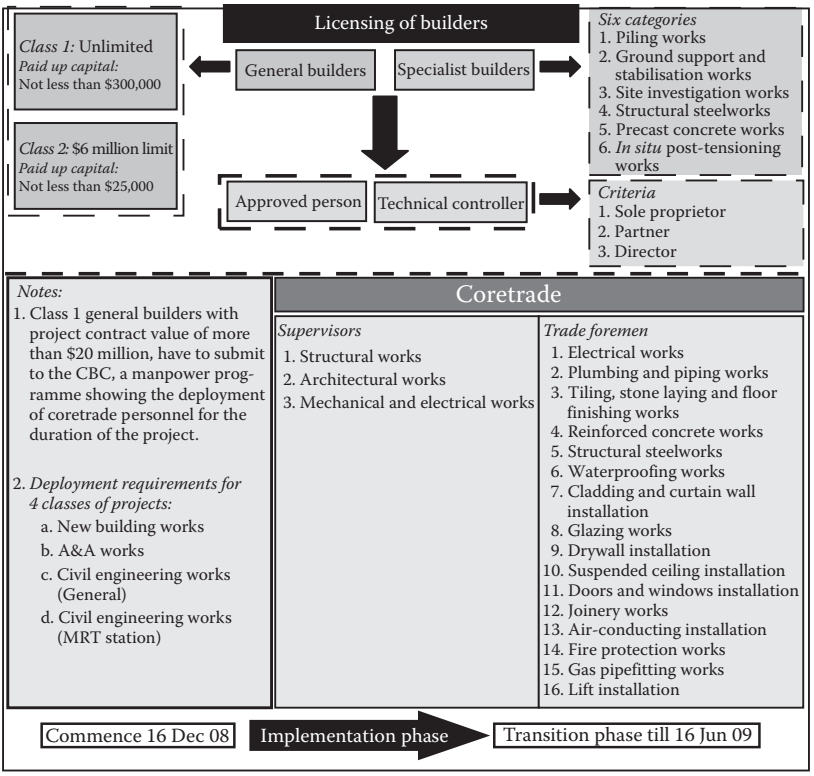

Figure 13.1 Licensing of builders.

Licenced Class 1 General Builders with project contract value of more than $20 million are required to deploy a minimum number of Construction Registration of Tradesmen (CoreTrade) personnel in their projects.

The following shall apply to construction projects for which the permits to commence structural works are submitted to BCA from 15 October 2011:

- There are four project categories under CoreTrade, in recognition of the distinct manpower needs of 'conventional' civil engineering (CE) works and CE works involving MRT stations:
  - New building works
  - Addition and alteration (A&A) works
  - Civil engineering works (general)
  - Civil engineering works (MRT station)
- With the new minimum Higher Skilled (or R1) Work Permit Holders (WPHs) proportion requirement at the firm-level to be implemented

from 1 January 2017, BCA will phase out the project-level CoreTrade deployment requirement for Tradesmen, and focus on building up key construction personnel at the Foremen and Supervisory levels with effect from 1 January 2015. Once implemented, all new and on-going CoreTrade projects will not be required to comply with the deployment requirements for the category of Tradesmen. Construction firms will still need to comply with the deployment requirements of Trade Foremen and Supervisors.

5. *Registration of CoreTrade personnel*
With effect from 16 June 2009, all Class 1 General Builders* undertaking a project of value $20 million or more are required to deploy a prescribed minimum number of construction personnel who are registered under the CoreTrade Scheme.

The objective of this requirement is to build up a core group of competent and experienced workers in key construction trades to anchor and lead the workforce, and raise its quality and productivity levels.

All CoreTrade personnel whose CoreTrade licence expiring from 1 October 2013 onwards and seeking renewal of CoreTrade registration are required to undergo Continual Educational Training (CET). Applicants can attend CET 6 months prior to the expiration of their CoreTrade registration.

In addition to the existing CoreTrade foremen and tradesmen, a new registration category of CoreTrade supervisors came into effect on 1 April 2012. This will extend the career progression path for CoreTrade personnel to move up from tradesmen, foremen to supervisor level.

With the new minimum Higher Skilled (or R1) Work Permit Holders (WPHs) proportion requirement at the firm-level to be implemented from 1 January 2017, BCA will phase out the project-level CoreTrade deployment requirement for Tradesmen, and focus on building up key construction personnel at the Foremen and Supervisory levels with effect from 1 January 2015. Once implemented, all new and on-going CoreTrade projects will not be required to comply with the deployment requirements for the category of Tradesmen. Construction firms will still need to comply with the deployment requirements of Trade Foremen and Supervisors.

6. *Enhance independence of parties in construction projects*
To avoid any situations of conflicts of interest, the Act imposes restrictions to insulate the QP and the contractor supervising the structural works from the influence of the developer or builder by requiring that

* Class 1 General Builder licence allows the holder to carry on the business of a general builder for any project.

the QP responsible for supervision should not be associated with the developer or builder.

7. *Standards on environmental sustainability*
   a. *Legislation on environmental sustainability for buildings*
      The BCA Green Mark Scheme was launched in 2005 to promote the development of environmentally sustainable buildings.

      With the objective to push for a wider adoption of green building technologies, BCA has enhanced the Building Control Act to include a minimum environmental sustainability standard that is equivalent to the Green Mark Certified Level for new buildings and existing ones that undergo major retrofitting.

      The Building Control (Environmental Sustainability) Regulations 2008 stipulates a minimum Green Mark score of 50 for affected building works since 15 April 2008. It applies to:
      - All new building works with gross floor area of 2,000 m^2 or more.
      - Additions or extensions to existing buildings which involve increasing gross floor area of the existing buildings by 2,000 m^2 or more.
      - Building works which involve major retrofitting to existing buildings with existing gross floor area of 2,000 m^2 or more.

   Alterations to existing buildings which do not involve major retrofitting works are not subject to this requirement.

   With effect from 1 December 2010, the minimum environmental sustainability standard has been revised. The compliance with the respective environmental sustainability standards will be based on the first submission date for URA planning permission as stated in the table below.

First submission date for URA planning permission	*Compliance standard*
From 15 April 2008 to 30 November 2010	*Code for Environmental Sustainability for Buildings*, 1st Edition, April 2008 Issue Addendum to Code (1st Edition), September 2014
From 1 December 2010 to 14 January 2013	*Code for Environmental Sustainability for Buildings*, 2nd Edition, August 2010 Issue Addendum to Code (2nd Edition), September 2014
From 15 January 2013 and onwards	*Code for Environmental Sustainability for Buildings*, 3rd Edition, October 2012 Issue Addendum to Code (3rd Edition), September 2014

The requirements on environmental sustainability of buildings will be integrated with the building plan process. The QP who submits the building plan and other appropriate practitioners will be responsible for assessing and scoring the building works under their charge

using the criteria and scoring methodology spelt out in the Code for Environmental Sustainability of Buildings.

Under the Legislation, Green Mark assessments are no longer required to be conducted as an independent third party certification. Compliance to the regulations will be based on QP's declaration and random audit, and site checks prior or during temporary occupation permit (TOP). However, third party assessment by BCA will be conducted to award projects with Green Mark Gold rating and above.

In line with the above regulations, the BCA Green Mark Assessment Criteria for new buildings has been revised and it takes effect from 15 January 2013 onwards. All Green Mark applications for new buildings that are submitted on or after this date will be assessed and verified based on this new version.

The Green Mark rates the environmental friendliness of a building based on a point scoring approach. Depending on the score, the rating is categorised into four levels – Platinum, Gold^{PLUS}, Gold and Certified.

Green Mark rating	*Green Mark points* *With effect from 15 January 2013* *Version 4.1* *New non-residential and residential buildings*	*Green Mark points* *With effect from 26 July 2012* *Version 3.0* *Existing non-residential buildings*
Green Mark Platinum	90 and above	90 and above
Green Mark Gold^{PLUS}	85 to <90	85 to <90
Green Mark Gold	75 to <85	75 to <85
Green Mark Certified	50 to <75	50 to <75

Green Mark rating	*Green Mark points* *With effect from 1 December 2009* *Version 2.1* *Non-residential existing buildings*	*Green Mark points* *With effect from 19 May 2011* *Version 1.0* *Existing residential buildings*
Green Mark Platinum	90 and above	90 and above
Green Mark Gold^{PLUS}	85 to <90	85 to <90
Green Mark Gold	75 to <85	75 to <85
Green Mark Certified	50 to <75	50 to <75

Green Mark rating	*Green Mark points* *With effect from 4 August 2011* *Version 1.0* *Existing schools*	*Green Mark points* *With effect from 1 July 2014* *Version 1.0* *Healthcare facilities*
Green Mark Platinum	90 and above	90 and above
Green Mark Gold^{PLUS}	85 to <90	85 to <90
Green Mark Gold	75 to <85	75 to <85
Green Mark Certified	50 to <75	50 to <75

Green Mark Rating	*Green Mark points With effect from 1 November 2012 Version 1.1 Office interior*	*Green Mark points With effect from 27 May 2009 Version 1.0 Landed houses*
Green Mark Platinum	95 and above	95 and above
Green Mark Gold^{PLUS}	85 to <95	85 to <95
Green Mark Gold	75 to <85	75 to <85
Green Mark Certified	50 to <75	50 to <75

Green Mark Rating	*Green Mark points With effect from 27 May 2009 Version 1.0 Infrastructure*
Green Mark Platinum	90 and above
Green Mark Gold^{PLUS}	80 to <90
Green Mark Gold	70 to <80
Green Mark Certified	50 to <70

Green Mark Rating	*Green Mark points With effect from 1 January 2013 Version 2.0 Districts*	*Pre-requistes*
Green Mark Platinum	100 and above	At least one building (GFA > 5000 m^2) at phase 1 to achieve Green Mark Platinum
Green Mark Gold^{PLUS}	90 to <100	At least one building (GFA > 5000 m^2) at phase 1 to achieve Green Mark Gold^{PLUS}
Green Mark Gold	75 to <90	At least one building (GFA > 5000 m^2) at phase 1 to achieve Green Mark Gold
Green Mark Certified	60 to <75	Nil

Green Mark Rating	*Green Mark points With effect from 12 September 2011 Version 1.0 Restaurants*	*Green Mark points With effect from 11 October 2012 Version 1.0 Supermarket*
Green Mark Platinum	95 and above	90 and above
Green Mark Gold^{PLUS}	85 to <95	85 to <90
Green Mark Gold	75 to <85	75 to <85
Green Mark Certified	50 to <75	50 to <75

Green Mark rating	*Green Mark points With effect from 11 October 2012 Version 1.1 Existing data centres*	*Green Mark points With effect from 14 March 2013 Version 1.1 New data centres*
Green Mark Platinum	90 and above	90 and above
Green Mark Gold^{PLUS}	85 to <90	85 to <90
Green Mark Gold	75 to <85	75 to <85
Green Mark Certified	50 to <75	50 to <75

Green Mark rating	*Green Mark points With effect from 11 October 2012 Version 1.0 Retail*	*Green Mark points With effect from 26 May 2010 Version 1.0 New parks*
Green Mark Platinum	95 and above	90 and above
Green Mark Gold^{PLUS}	85 to <95	85 to <90
Green Mark Gold	75 to <85	75 to <85
Green Mark Certified	50 to <75	50 to <75

Green Mark rating	*Green Mark points With effect from 22 May 2008 Version 1.0 Existing parks*
Green Mark Platinum	90 and above
Green Mark Gold^{PLUS}	85 to <90
Green Mark Gold	75 to <85
Green Mark Certified	50 to <75

b. *Mandatory higher Green Mark standard for GLS sites in selected strategic areas*

It was announced in BCA's second Green Building Masterplan in 2009 that projects developed on GLS sites in the selected strategic growth areas will be subject to higher Green Mark standards. This requirement aims to maximise the potential for cost-effective energy savings in our built environment.

Any new development located on land sold on or after the stipulated dates under the GLS Programme in the following strategic areas are required to be designed to meet the prescribed Green Mark certification:

Selected strategic areas *Exact location to refer to the building control (Environmental Sustainability Regulations 2008)*	*Requirements for building wholly or partly within area that is on land sold under the GLS programme*
1. On or after 5 May 2010	
Marina Bay	Green Mark Platinum
Downtown Core – including areas within the CBD located next to Marina Bay	Green Mark Gold^{PLUS}
Kallang Riverside	
Paya Lebar Central	
2. On or after 20 July 2012	
Jurong Lake District	Green Mark Gold^{PLUS}
3. On or after 1 September 2014	
Woodlands Regional Centre	Green Mark Gold^{PLUS}
Punggol Eco-Town	

Source: Building and Construction Authority as on 4 September 2014.

For building works that are subject to this requirement, the QPs need not submit their declaration of the Green Mark scores along with the building plan submission.

Instead, the QPs should ensure that, prior to the building plan submission, an application is made to BCA for the project to obtain the Green Mark Certification in accordance with the BCA Green Mark Certification Standard for New Buildings. Upon completion of the building works, the QPs should submit the Green Mark Certification rating achieved for the project along with his application for TOP or Certificate of Statutory Completion (CSC). The prescribed Green Mark Certification rating for the building has to be obtained before a TOP/CSC can be granted.

The certification standard has been revised from 1 December 2010 in tandem with the changes in the Green Mark Criteria. The compliance with the respective certification standards will be based on the tender award letter issued by the URA to the successful developer under the GLS programmes for the selected strategic areas and as stated in the following table:

Date of tender award/land sold under the GLS programmes	*Compliance standard*
From 5 May 2010 to 30 November 2010	BCA Green Mark Certification Standards for New Building, GM Version 3.0, May 2010 issue Addendum to Certification Standard (GM version 3.0), September 2014

Continued

Date of tender award/land sold under the GLS programmes	*Compliance standard*
From 1 December 2010 to 14 January 2013	BCA Green Mark Certification Standards for New Building, GM Version 4.0, August 2010 issue Addendum to Certification Standard (GM version 4.0), September 2014
From 15 January 2013 and onwards	BCA Green Mark Certification Standards for New Building, GM Version 4.1, October 2012 issue Addendum to Certification Standard (GM version 4.1), September 2014

Source: Building and Construction Authority as on 4 September 2014.

8. *Maintenance of barrier-free provisions*
   In August 2013, BCA introduced its new Code on Accessibility in the Built Environment 2013 (the Code). The provisions of the Code will apply to new projects and existing buildings, which will undergo additional and alteration works have to follow the Code when they are submitted to BCA for regulatory approval from 1 April 2014.

   The Code was first introduced in 1990 and aids to make our buildings more user-friendly for the physically challenged. The Code was last reviewed and expanded in 2007 to include additional requirements related to the interconnection between buildings, and from buildings to infrastructure and more mandatory requirements on elder-friendly features to prepare for an ageing population.

   The Code was reviewed by a tripartite working committee comprising representatives from government agencies, industry stakeholders, academic institution and voluntary welfare organisations. In this fourth revision, the needs of persons with disabilities remain the primary focus. More mandatory requirements are introduced to minimise restrictions to environment by allowing persons with disabilities to make full use of the building premises and amenities. The Code also places greater emphasis on universal design concepts and introduces new requirements that will benefit a wider spectrum of the community.
9. *Stiffer penalties for non-compliance*
   The penalties provided in the new Act are set at a higher level than those found in the previous Act in order to align them with the relevant provisions of the Workplace Safety and Health Act (WSHA).
10. *Statutory duty on developers to report any contravention of the Building Control Act and Regulations to the CBC*
    Under the Act, the developer, who is one of the key parties in the project, has a duty to report to the CBC of any contravention of the Building Control Act/Regulations related to the project that he knows or ought reasonably to know.

11. *New requirements under the Building Control (Amendment) Regulations 2013 and their commencement dates*
On 28 October 2013, BCA issued a circular to announce the changes to requirements under the Building Control (Amendments) Regulations and their commencement dates. The changes will be implemented in the following two stages:

Stage 1: Amendments that came into effect on 28 October 2013.

Reg	*Amendment*
38A	All ready-mixed concrete used for structural elements in major building works (i.e. works that require the endorsement of an AC) has to be obtained from a plant which holds a valid product conformity certificate, and the specification of the ready-mixed concrete *has to be listed in the product conformity certificate. A 'product conformity certificate' is a* certificate issued by a certification body that is accredited by the Singapore Accreditation *Council under the Council's Accredited Scheme for Product Certification Bodies for the* certification of ready-mixed concrete. This requirement is also applicable to on-site batching plants and plants supplying concrete for structural precast elements.
38B	The installation of any movable panel that is to be fixed on the exterior surface of a building is *prohibited*, except for a detached, semi-detached, terrace or linked house used solely as a *residence. A 'movable panel' includes a board, frame, plank or pane, which is designed to* slide along a guide or track, or pivot about a pin, and which is constructed of any material.
41D	Other than an approved window contractor, a licensed builder may now be engaged for window installations. The current requirement for the actual installation to be carried out only by a trained window installer or by someone else under the supervision and guidance of a trained window installer remains unchanged.
41E (1A)	A licensed builder or an approved window contractor carrying out the replacement or modification of windows shall, not later than 14 days after the completion of the works, submit a certification of completion to the CBC.
42 and 43	All applications for TOP or CSC are required, where applicable, to be accompanied by the following: a. Clearances, permits or approvals under the Fire Safety Act related to fire safety from the Commissioner of Civil Defence. b. Clearances, permits or approvals under the Sewerage and Drainage Act related to sewerage and drainage from the Public Utilities Board. c. Clearances, permits or approvals under the Environmental Protection and Management Act from the Director General of Environmental Protection. d. Clearances, permits or approvals under the Street Works Act and Parking Places Act from the Land Transport Authority of Singapore. e. Clearances, permits or approvals under the Parks and Trees Act from the Commissioner of Parks and Recreation.

Continued

Reg	*Amendment*
Fourth Schedule	The list of minor works not requiring the certificate of an AC has been amended. Please refer to BCA's website at www.bca.gov.sg for details.
Fifth Schedule	Paragraph M, 'Safety of windows': The performance requirements will cover all window types (i.e. casement and sliding) and address proper design.
Sixth Schedule	The use of any material on the external surface of the buildings which has daylight reflectance exceeding 20% is prohibited. Daylight reflectance of a material refers to the sum of both the specular and diffuse reflections of the material.

Stage 2: Amendments that came into effect on 1 April 2014.

Reg	*Amendment*
4(1)(e)	Where an alternative solution is to be utilised in any building work and the QP for the building *works is not the specialist in that alternative solution*, the application for approval of the plans of those building works shall be accompanied by details of the alternative solution, together with *the certificate of a specialist in the alternative solution* referred to in Section 9(2)(b)(ii) of the Building Control Act.
9(2)(b)	The structural design calculations submitted for approval will not be required to be signed and endorsed by an AC.
4(1)(vi) 10B	An appropriate QP has to be appointed to prepare and submit demolition work plans for approval by the CBC before a permit is granted for demolition works to commence. The QP has to supervise the demolition works in accordance with Section 9 of the Act.
18(2A) 18(3A)	For deviations involving material changes from *approved building plans* (i.e. the non-structural plans), amendment plans have to be submitted for approval before the affected works are allowed to commence. No approval is required for deviations involving immaterial changes, which are to be submitted as record plans.
24(4)	Slight revision is made to the list of pre-requisite qualifications for registration as a resident technical officer.
First Schedule	The list of insignificant building works has been revised to include more types of works and to make some of the existing provisions clearer. Please refer to BCA's website at www.bca.gov.sg for details.
Fifth Schedule	Amendments have been made to some provisions in the Fifth Schedule to add clarity to the performance requirements. Please refer to BCA's website at www.bca.gov.sg for details.

Source: Building and Construction Authority.

CONSTRUCTION COST DATA

Cost of labour

The figures that follow are typical of labour costs in Singapore as at June 2013. The wage rate is the basis of an employee's income, while the cost of

labour indicates the cost to a contractor of employing that employee. The difference between the two covers a variety of mandatory and voluntary contributions – a list of items which could be included is given in Chapter 2.

	Wage rate (per day) S$	*Cost of labour (per day) S$*	*Number of hours worked per year*
Site operatives			
Bricklayer	N/A	N/A	N/A
Carpenter	63	79	2,288
Plumber	67	84	2,288
Electrician	76	95	2,288
Structural steel erector	67	84	2,288
Welder	67	84	2,288
Labourer	42	53	2,288
Equipment operator	105	131	2,288
Site supervision	*(per month)*	*(per month)*	
General foreman	2,500	3,650	2,288
Trades foreman	2,500	3,650	2,288
Clerk of works	4,000	5,840	2,288
Resident engineer	4,500	6,570	2,288
Contractors' personnel			
Site manager	5,500	8,030	2,288
Site engineer	3,800	5,550	2,288
Site quantity surveyor	3,700	5,400	2,288
Consultants' personnel			
Senior architect	7,500	10,950	2,080
Senior engineer	5,100	7,450	2,080
Senior surveyor	5,270	7,690	2,080
Qualified architect	5,500	8,030	2,080
Qualified engineer	3,600	5,260	2,080
Qualified surveyor	3,770	5,500	2,080

Cost of materials

The figures that follow are the costs of main construction materials, delivered to site in Singapore, as incurred by contractors in the fourth quarter of 2013. These assume that the materials would be in quantities as required for a medium-sized construction project and that the location of the works would be neither constrained nor remote.

All the costs in this section exclude goods and services tax (GST).

	Unit	*Cost S$*
Cement and aggregate		
Ordinary Portland cement in 50 kg bags	tonne	99.00
Coarse aggregates for concrete	tonne	20.00
Fine aggregates for concrete	tonne	20.00
Ready-mixed concrete (Grade 30)	m^3	99.00
Ready-mixed concrete (Grade 20)	m^3	95.00
Steel		
Mild steel reinforcement	tonne	723.00
High tensile steel reinforcement	tonne	723.00
Structural steel sections	tonne	1,060.00
Bricks and blocks		
Common bricks (215 × 102.5 × 65 mm)	1,000	230.00
Good-quality facing bricks (215 × 102.5 × 65 mm)	1,000	800.00
Hollow concrete blocks (390 × 190 × 100 mm)	1,000	650.00
Timber and insulation		
Hardwood for joinery	m^3	1,140.00
Exterior quality plywood (12 mm)	m^2	9.00
Plywood for interior joinery (12 mm)	m^2	8.00
50 mm thick quilt insulation (16 kg/m^3)	m^2	3.50
50 mm thick rigid slab insulation (60 kg/m^3)	m^2	13.00
Hardwood internal door complete with frame and ironmongery	each	825.00
Glass and ceramics		
Float glass (10 mm)	m^2	30.00
Sealed double glazing units (6/12/6) including frame	m^2	400.00
Plaster and paint		
Good quality ceramic wall tiles (300 × 300 × 8 mm)	m^2	30.00
Plasterboard (13 mm thick) – gypsum	m^2	3.00
Emulsion paint in 5 litre tins	litre	6.00
Gloss oil paint in 5 litre tins	litre	8.00
Tiles and paviors		
Clay floor tiles (100 × 200 × 8 mm)	m^2	25.00
Vinyl floor tiles (300 × 300 × 2 mm)	m^2	20.00
Clay roof tiles	1,000	N/A
Precast concrete roof tiles	1,000	N/A

Continued

	Unit	*Cost S$*
Drainage		
WC suite complete	each	350.00
Wash hand basin complete	each	140.00
100 mm diameter clay drain pipes	m	N/A
150 mm diameter cast iron drain pipes (medium grade)	m	N/A

Unit rates

The descriptions that follow are generally shortened versions of standard descriptions listed in full in Chapter 19. Where an item has a two-digit reference number (e.g. 05 or 33), this relates to the full description against that number in Chapter 19. Where an item has an alphabetic suffix (e.g. 12A or 34B), this indicates that the standard description has been modified. Where a modification is major, the complete modified description is included here and the standard description should be ignored; where a modification is minor (e.g. the insertion of a named hardwood), the shortened description has been modified here but, in general, the full description in Chapter 19 prevails.

The unit rates that follow are for main work items on a typical construction project in Singapore in the fourth quarter of 2013. The rates include all necessary labour, materials and equipment.

All the rates in this section exclude GST.

		Unit	*Rate S$*
Excavation			
01	Mechanical excavation of foundation trenches	m^3	23.00
02	Hardcore filling making up levels	m^3	50.00
Concrete work			
04	Plain *in situ* concrete in strip foundations in trenches (Grade 20)	m^3	149.00
05	Reinforced *in situ* concrete in beds (Grade 30)	m^3	153.00
06	Reinforced *in situ* concrete in walls (Grade 30)	m^3	153.00
07	Reinforced *in situ* concrete in suspended floors or roof slabs (Grade 30)	m^3	153.00
08	Reinforced *in situ* concrete in columns (Grade 30)	m^3	153.00
09	Reinforced *in situ* concrete in isolated beams (Grade 30)	m^3	153.00

Continued

		Unit	*Rate S$*
Formwork			
11A	Waterproof plywood formwork to concrete walls	m^2	40.00–45.00
12A	Waterproof plywood formwork to concrete columns	m^2	40.00–45.00
13A	Waterproof plywood formwork to horizontal soffits of slabs	m^2	40.00–45.00
Reinforcement			
14	Reinforcement in concrete walls	tonne	1,600.00–1,750.00
15	Reinforcement in suspended concrete slabs	tonne	1,600.00–1,750.00
16	Fabric reinforcement in concrete beds	m^2	8.90
Steelwork			
17	Fabricate, supply and erect steel framed structure	tonne	4,800.00–5,800.00
18	Framed structural steelwork in universal joist sections	tonne	4,800.00–5,800.00
19	Structural steelwork lattice roof trusses	tonne	4,800.00–5,800.00
Brickwork and blockwork			
20	Precast lightweight aggregate hollow concrete block walls	m^2	27.00–29.00
21A	Solid (perforated) common brick	m^2	30.00–35.00
23	Facing bricks (half brick thick)	m^2	47.00–52.00
Roofing			
24	Concrete interlocking roof tiles 430 × 380 mm	m^2	N/A
25	Plain clay roof tiles 260 × 160 mm	m^2	60.50
29	Three layers glass-fibre-based bitumen felt roof covering	m^2	36.00
33	Troughed galvanised steel roof cladding	m^2	42.00
Woodwork and metalwork			
34	Preservative treated sawn hardwood 50 × 100 mm	m	12.00
35	Preservative treated sawn hardwood 50 × 150 mm	m	18.00
37	Two-panel glazed door in Kapur hardwood, size 850 × 2100 mm	each	800.00
38	Solid core half hour fire resisting hardwood internal flush door, size 900 × 2100 mm	each	1,000.00
39	Aluminium double glazed window, size 1200 × 1200 mm	each	750.00
41	Hardwood skirtings	m	8.50
Plumbing			
42	Galvanised half-round eaves gutter	m	N/A
43	UPVC rainwater pipes	m	45.00
44	Light gauge copper cold water tubing	m	29.00

Continued

		Unit	*Rate S$*
45	High-pressure plastic pipes for cold water supply	m	22.00
47	UPVC soil and vent pipes	m	69.00
48	White vitreous China WC suite	each	500.00
49	White vitreous China wash hand basin	each	250.00
51A	Stainless-steel double bowl sink and double drainer	each	400.00
Electrical work			
52	PVC insulated and copper sheathed cable	m	1.80
53	13 amp unswitched socket outlet	each	N/A
54	Flush mounted 20 amp, one way light switch	each	40.00
Finishings			
55A	Two coats cement and sand (1:4) plaster on brick walls	m^2	15.50
56	White glazed tiles on plaster walls	m^2	40.00
57	Red clay quarry tiles on concrete floors	m^2	70.00
58	Cement and sand screed to concrete floors	m^2	18.00
59	Thermoplastic floor tiles on screed	m^2	25.00
60	Mineral fibre tiles on concealed suspension system	m^2	38.00
Glazing			
61	Glazing to wood	m^2	42.00
Painting			
62	Emulsion on plaster walls	m^2	3.50–4.00
63	Oil paint on timber	m^2	9.40

Approximate estimating

The building costs per unit area that follow are averages incurred by building clients for typical buildings in Singapore as at the fourth quarter of 2013. They are based upon the total floor area of all storeys, measured between external walls and without deduction for internal walls.

Approximate estimating costs generally include mechanical and electrical installations but exclude furniture, loose or special equipment, and external works; they also exclude fees for professional services. The costs shown are for specifications and standards appropriate to Singapore and this should be borne in mind when attempting comparisons with similarly described building types in other countries. A discussion of this issue is included in Chapter 2. Comparative data for countries covered in this publication, including construction cost data, are presented in Part III.

Approximate estimating costs must be treated with caution; they cannot provide more than a rough guide to the probable cost of building. All the rates in this section exclude GST.

	Cost m² S$	*Cost ft² S$*
Industrial buildings		
Factories for letting	1,450	135
Factory/office (high tech) for letting (shell and core only)	1,800	167
Factory/office (high tech) for letting (ground floor shell, first floor offices)	1,950	181
High tech laboratory workshop centres (air-conditioned)	2,100	195
Warehouses, low bay (6–8 m high) for letting	1,350	125
Administrative and commercial buildings		
Offices for letting, 5–10 storeys, non-air-conditioned	N/A	N/A
Offices for letting, 5–10 storeys, air-conditioned	2,500	232
Offices for letting, high rise, air-conditioned	2,750	255
Prestige/headquarters office, 5–10 storeys, air-conditioned	2,750	255
Prestige/headquarters office, high rise, air-conditioned	3,050	283
Health and education buildings		
General hospitals (100 beds)	3,950	367
Private hospitals (100 beds)	4,150	386
Health centres	3,250	302
Primary/junior schools	N/A	N/A
Secondary/middle schools	N/A	N/A
University	2,500	232
Recreation and arts buildings		
Theatres (<500 seats)	4,000	372
Sports halls including changing and social facilities	3,050	283
Swimming pools (international standard) (Olympic size)	each	2,100,000
Swimming pools (schools standard) including changing facilities	each	1,900,000
City centre/central libraries	N/A	N/A
Branch/local libraries	N/A	N/A
Residential buildings		
Private/mass market single family housing 2-storey detached/semi-detached (multiple units)	3,150	293
Purpose designed single family housing 2-storey detached (single unit)	4,200	390
Social/economic apartment housing, high rise (with lifts)	N/A	N/A
Private sector apartment building (standard specification)	2,950	274
Private sector apartment buildings (luxury)	4,400	409
Student/nurses halls of residence	2,500	232
Homes for the elderly (shared accommodation)	1,950	181
Hotel, 5 star, city centre	4,500	418
Hotel, 3 star, suburbs	3,350	311

Goods and services tax (GST)

The standard rate of GST is currently 7%, chargeable on general building work.

EXCHANGE RATES AND INFLATION

The combined effect of exchange rates and inflation on prices within a country and price comparisons between countries are discussed in Chapter 2.

Exchange rates

Figure 13.2 plots the movement of the Singapore dollar against sterling, the euro, the US dollar and 100 Japanese yen since 2003. The values used in the figure are quarterly, and the method for calculating this is described and general guidance on the interpretation of the figure are provided in Chapter 2. The average exchange rate in the fourth quarter of 2013 was S$2.02 to pound sterling, S$1.70 to euro, S$1.25 to US dollar and S$1.25 to 100 Japanese yen.

Price inflation

Table 13.2 presents TPI in Singapore since 2003.

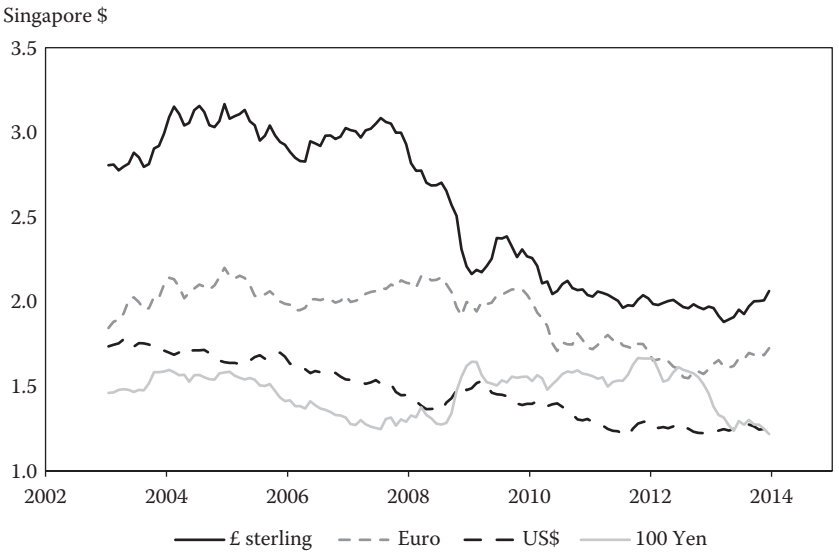

Figure 13.2 The Singapore dollar against sterling, euro, US dollar and 100 Japanese yen.

Table 13.2 Tender price index (base year at 1998)

Year	*Tender price index*	*Year*	*Tender price index*
2003	89.3	2009	122.0
2004	94.7	2010	117.1
2005	97.7	2011	120.1
2006	105.5	2012	120.4
2007	128.5	2013	125.6
2008	146.5		

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Chapter 14

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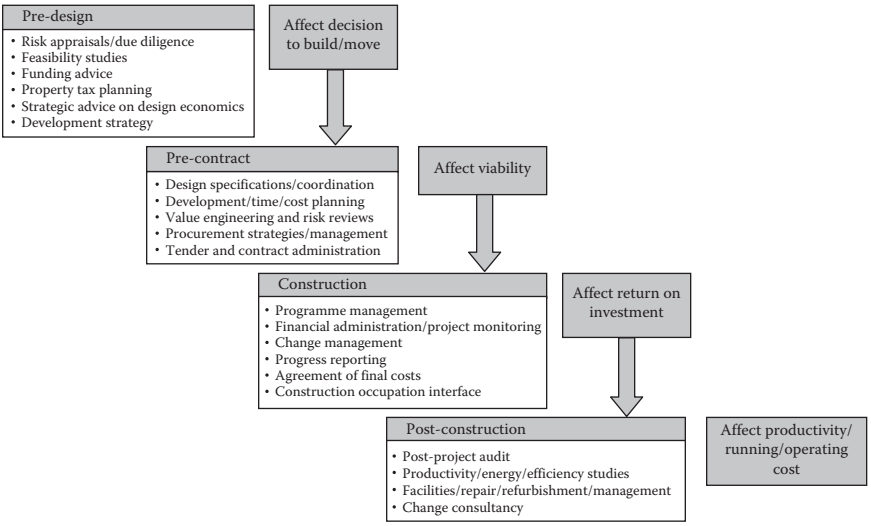

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All data relate to 2013 unless otherwise indicated.

Population	
Population	49.2 mn
Urban population (2010)	82%
Population under 15	14.6%
Population 65 and over	12.3%
Average annual growth rate (2008–2012)	0.57%
Geography	
Land area	99,678.12 km^2
Agricultural area	22%
Capital city	Seoul
Population of capital city	10.4 mn
Economy	
Monetary unit	South Korean Won (W)
Exchange rate (average fourth quarter 2013) to:	
The pound sterling	W 1,719
The US dollar	W 1,062
The euro	W 1,446
The yen × 100	W 1,057
Average annual inflation (2008–2013)	2.98%
Inflation rate	1.28%
Gross domestic product (GDP) (2012)	W 1,272,460 bn
GDP per capita (2012)	W 24,735,000
Average annual real change in GDP (2008–2013)	4.93%
Private final consumption as a proportion of GDP (2012)	53.50%
Public consumption as a proportion of GDP (2012)	15.83%
Investment as a proportion of GDP	28.8%
Construction	
Gross value of construction output (2012)	W 232,502.9 bn
Net value of construction output (2012)	W 162,923.2 bn
Net value of construction output as a proportion of GDP (2012)	13%

THE CONSTRUCTION INDUSTRY

Construction output

The gross output of construction in 2012 was about W232,502.9 billion, equivalent to US$206.5 billion, or 18.8% of GDP. The net output of construction in 2012 was about W162,923.2 billion, equivalent to US$144.7 billion, or 13.2% of GDP.

Construction investment growth has slowed temporarily, while private consumption and equipment investment have shown a gradual easing in contraction, suggesting that domestic demand is improving at a modest pace. The construction sector continued to recover strongly during the third quarter of 2013, primarily due to a surge in activity in the residential building sector. However, growth is likely to decelerate in 2014 with construction real growth forecast at just 1.1%. This is generally a result of a subdued outlook towards South Korea's construction sector drivers – namely, weak macro fundamentals for residential buildings, outlook for non-residential buildings and declining government spending on infrastructure.

The amount of construction orders received indicates a higher rate of increase than the previous month (March 2014) registering a 27.8% year-on-year rate, contributing to maintaining a positive recovery momentum. Meanwhile, civil engineering sectors have posted a sharp fall of –10.2% due to a reduction in the Government spending on Social Overhead Capital (SOC) areas, and accordingly, the value of construction completed weakened temporarily from previously, registered a 2.1% growth rate. Initiated construction building works recorded a sharp rise to 69.6%, primarily due to the increase in residential building construction making a positive contribution to the recovery trend in the construction sector (Table 14.1).

Construction investment

Except for a minor increase in 2009, overall investment in residential construction remained stagnant. After a weak performance due to the financial crisis back in 2008, non-residential building construction had shown a slight upward trend since the second half of 2009.

SOC investments in 2008 changed the civil engineering work trend to an incline which extended until the beginning of 2010. Investment remained in decline until 2012, and has since remained steady and is expected to moderately increase at a better pace than previously. As part of their preparation for the 2018 Winter Olympic Games, the Government has announced future investment on further improvements to infrastructure works to connect the central city of Wonju to the host cities Pyeongchang and Gangneung.

Construction investment (advanced estimates of GDP) in the fourth quarter of 2013 fell 3.8% quarter-on-quarter, contrary to the annual trend which climbed 8.1% year-on-year (Table 14.2).

Characteristics and structure of the industry

The major contractors in terms of revenue are given in Table 14.3.

Table 14.1 Trends in the increased rates of construction investment indices

Category	*2008*	*2009*	*2010*	*2011*	*2012*
Construction investment (%)	–2.8	3.4	–3.7	–4.7	–2.2
Building construction (%)	–	–4.9	–1.5	–2.7	–1.7
Residential construction (tri. won)	40.2	39.5	34.2	29.2	27.6
Non-residential construction (tri. won)	51.9	50.5	54.4	56.9	57.1
Civil engineering works (%)	–	17.5	8.7	–7.3	–2.9
Construction works completed (%)	–	3.2	2.7	–0.6	–3.3
(by) public sector (%)	–	21.2	8.5	–0.1	–3.7
(by) private sector (%)	–	–5.8	0.6	–2.2	–2.0

		2013			
Category	*2013*	*Q1*	*Q2*	*Q3*	*Q4*
Construction investment (%)	6.9	4.1	3.4	3.2	–3.8
Building construction (%)	–	4.6	3.7	3.9	–
Residential construction (tri. won)	–	–	–	–	–
Non-residential construction (tri. won)	–	–	–	–	–
Civil engineering works (%)	–	3.5	3.1	2.3	–
Construction works completed (%)	10.4	21.5	27.6	–7.9	20.0
(by) public sector (%)	2.1	29.1	33.4	13.5	25.0
(by) private sector (%)	17.5	15.3	24.3	–4.6	16.3

Source: The Bank of Korea, Statistics Korea.

Table 14.2 Percentage change from previous quarter

	2011[a]	*2012*[a]			*2013*[a]				
Category	*Annual*	*Annual*	*Q3*	*Q4*	*Annual*	*Q1*	*Q2*	*Q3*	*Q4*
Construction investment[b]	–4.7	–2.2	0.7	1.2	6.9	4.1	3.4	3.2	3.8
(year-on-year)	–	–	0.3	4.2	–	2.4	7.2	8.6	8.1
Building construction	–2.7	–1.7	0.1	0.3	–	4.6	3.7	3.9	–
Civil engineering works	–7.3	–2.9	1.5	2.4	–	3.5	3.1	2.3	–

Source: The Bank of Korea.

[a] Preliminary.
[b] National accounts.

Under the *Construction Industry Promotion Act*, any person who desires to operate a construction business has to be licensed by the Minister of Construction and Transportation (MOCT). The various types of licences are as follows:

Classification	*Type of licence*
General contractor	• Civil engineering and building • Building • Civil engineering
Specialty contractor	• 32 types of different trades including decoration, steelwork, etc.

Source: Construction Economic Bureau, MOCT.

There are altogether 70,662 licences, of which 3,408 are for general contractors and 67,254 speciality contractors as of April 2014.

The top 100 firms dominate the construction market, accounting for 60% of the total contract value. The 50 larger firms made up about 47% of the total contract value.

The industry is heavily dependent on subcontractors. There are 32 different types of licences as defined and authorised by Presidential Decree.

Engineers are employed as engineering consultants, safety inspectors and research development specialists. The National Technical Qualification Act stipulates that a construction engineer must be assigned to the site. Construction engineers are classified under four levels depending on experience and educational background: master engineer, class 1 engineer, class 2 engineer and entry level engineers. According to the Korea Construction Engineers Association, there are 26,259 master engineers, 236,582 class 1 engineers and 105,472 class 2 engineers.

Only licensed architects are allowed to practise either as a partnership, corporation or individual proprietorship. Their activities are governed by the National Architectural Code and include architectural design, construction management and supervision.

Table 14.3 Major Korean contractors

Major contractors	*2013 Revenue Won (million)*	*Rank in 2013 Top 10*
Hyundai Engineering & Construction	12,037,104	1
Samsung C&T Corp	11,251,610	2
Daewoo Engineering & Construction	9,453,841	3
Daelim Construction	9,032,695	4
POSCO Engineering & Construction	8,848,869	5
GS Engineering & Construction	8,490,479	6
Lotte Engineering & Construction	5,190,644	7
SK Engineering & Construction	4,511,608	8
Hyundai Development Company	3,799,119	9
Hanwha Engineering & Construction	3,656,340	10

Source: Korean National Statistics Office.

Clients and finance

The real estate development and construction market in South Korea makes independent advancement into new projects difficult due to finance institutions' PF loan regulations, the uncertainty of investment collection and changes in money market rates. Hence, overseas investors are reducing the subjects of investments to office buildings with high securitisation rates, SOC projects and guaranteed investment projects are changing development methods from independent or leading-type development into development through collaboration and cooperation.

Through new designation of Chungbuk FEZ and East Coast region FEZ, Korea have eight FEZs, two enterprise cities, one tourism and leisure city, one special self-governing province and eight innovation cities. This suggests that the central government and local governments intend to put emphasis on region-oriented models in national land development projects.

Meanwhile, since inflows of private capitals are essential for the finalisation of development districts and the establishment of concrete project plans, friction with depressed domestic private development projects is expected.

Large development projects, such as the Saemangeum land reclamation project, the relocation of public institutions to provinces, innovation city development projects, and the attraction of the Winter Olympic Games to Pyeongchang are implemented in terms of regional economy activation and the efficiency of national land development. These government-led development projects are implemented simultaneously creating an adverse effect of dispersing the interest of foreign and domestic investors.

Global financial investors that have advanced into South Korea can be divided into Venture Capitals (VC) and Private Equity Funds (PEF). PEFs mainly make profits by taking over the management rights of enterprises that entered into their mature stage, enhancing their enterprise value and reselling the enterprises to strategic/financial investor. Currently all five global PEFs, Goldman Sachs, The Carlyle Group, KKR, TPG and Apollo, have made investments in South Korea or are reviewing the possibility of investments.

Selection of design consultants

In the public sector, consultants are selected in competition. The private sector client usually chooses the designer but for large projects, a competition may be held on an international basis to include foreign consultants. Design is generally separated from construction but for certain projects, design and build or turnkey method of procurement is adopted.

Contractual arrangements

The previously revamped evaluation system for selection of suitable contractors focuses on qualitative performance. It measures technical ability,

quality achievement, environment and safety observance and is computed by the authority responsible for construction licensing of all general contractors and some speciality contractors. The results are promulgated to the public and used as guidelines in the selection process.

There are four methods of selecting contractors: open, limited, selective and negotiation. Open tendering is used for small projects while for large projects, limited tendering is preferred. Where there are less than 10 eligible contractors because of the nature of the project, or the project is too small for open tendering, or preferential treatment is to be given to outstanding small and medium-sized firms, selective tendering is used. Competitive tendering is used extensively in the public sector and for large projects, limited and selective tendering are also adopted. The private sector prefers selective tendering and even negotiation.

Firm price contract is the most common form of contractual arrangement. However, during periods of price fluctuations, contracts usually contain a 'rise-and-fall clause' which allows the contractor to charge the client any increase in the actual labour and material prices over those prevailing at the time the contract is awarded. At the tendering stage, alternative design bids are sometimes allowed with the cost savings accruing to the tenderer. During the construction stage, contractors are encouraged to implement cost saving methods through financial incentives.

The contract documents include specifications, tax certificates, written guarantees, and the like and the contract itself covers the normal contractual arrangements including provisions for delay and defects liability.

Public sector projects are covered by the Government Procurement Agreement (GPA) under the World Trade Organization (WTO), which Korea is a signatory since 1996. Tendering and award procedures follow strictly the GPA rules in the case of Central Government projects valued at more than W5 billion, and W15 billion for Local Government projects.

Liability and insurance

Various insurances and guarantees are compulsory such as those related to performance in bidding, carrying out the work, maintenance, health and safety and also for protection against dumping. It is also mandatory to insure against workers' compensation and fire. Some contractors have other additional insurance arrangement.

Development control and standards

In each city and town, there is an area zoning for overall and regional development planning. While alterations to the plans are possible, they are very unusual and difficult to comply.

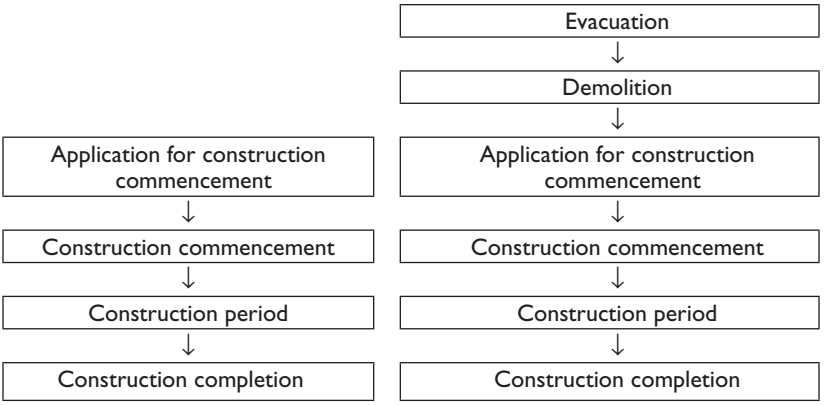
Each project is assessed in terms of its traffic impact and then in terms of the building itself, its energy usage, structure and aesthetics.

The speed of the approval process depends on the region, the size of the project and its purpose but the whole process normally takes 6–8 months. Sophisticated buildings such as hotels, condominiums, sports centres or fire stations may take longer. There are laws on requirements for building structures and facility standards which must be rigidly adhered to. *Korean Standards* (KS) also exist for building materials such as bricks, glass, steel and aggregates.

Development procedures

General building construction	*Redevelopment project*
	Assignment of redevelopment zone
	↓
Project plan preparation	Project plan preparation
	↓
	Request for rezoning (if necessary)
	↓
	Urban planning review board of district office
↓	↓
	Urban-architectural design review board
	↓
	Approval for rezoning (if necessary)
	↓
Traffic and environmental impact assessment	Traffic and environmental impact assessment
↓	↓
Design review board	Design review board
↓	↓
Design development and permit drawing preparation	Design development and permit drawing preparation
↓	↓
Application for building permit	Application for building permit
↓	↓
Building permit	Building permit (project development permit)
↓	↓
Construction drawing preparation	Construction drawing preparation
↓	↓

Continued



CONSTRUCTION COST DATA

Cost of labour

The figures that follow are typical of labour costs in South Korea as at the fourth quarter of 2013. The wage rate is the basis of an employee's income, while the cost of labour indicates the cost to a contractor of employing that employee. The difference between the two covers a variety of mandatory and voluntary contributions – a list of items which could be included is given in Chapter 2.

	Wage rate (per day) Won	*Cost of labour (per day) Won*	*Number of hours worked per year*
Site operatives			
Mason/bricklayer	110,100	122,300	3,100
Carpenter	111,200	123,500	3,100
Plumber	116,500	129,400	3,100
Electrician	131,300	145,900	3,100
Structural steel erector	113,600	145,900	3,100
HVAC installer	97,800	108,700	3,100
Semi-skilled worker	93,000	103,400	3,100
Unskilled labourer	75,700	84,100	3,100
Equipment operator	164,400	182,700	3,100
Watchman/security	73,200	81,400	3,100

Continued

	Wage rate (per day) Won	*Cost of labour (per day) Won*	*Number of hours worked per year*
Site supervision			
General foreman	95,200	105,800	3,100
Trades foreman	92,000	102,300	3,100
Clerk of works	75,600	84,000	3,100
Contractors' personnel	*(per month)*	*(per month)*	
Site manager	7,535,000	8,372,000	2,730
Resident engineer	5,570,000	6,189,000	2,730
Resident surveyor	5,570,000	6,189,000	2,730
Junior engineer	4,223,000	4,692,000	2,730
Junior surveyor	4,223,000	4,692,000	2,730
Planner	3,150,000	3,500,000	2,730
Consultants' personnel			
Senior architect	5,310,000	5,900,000	1,920
Senior engineer	5,310,000	5,900,000	1,920
Senior surveyor	5,310,000	5,900,000	1,920
Qualified architect	6,293,000	6,992,000	1,920
Qualified engineer	6,293,000	6,992,000	1,920
Qualified surveyor	6,293,000	6,992,000	1,920

Cost of materials

The figures that follow are the costs of main construction materials, delivered to site in the Seoul area, as incurred by contractors in the fourth quarter of 2013. These assume that the materials would be in quantities as required for a medium-sized construction project and that the location of the works would be neither constrained nor remote. All the costs in this section exclude value-added tax (VAT).

	Unit	*Cost Won*
Cement and aggregate		
Ordinary Portland cement in 40 kg bags	bag	4,330
Coarse aggregates for concrete	m^3	19,100

Continued

Fine aggregates for concrete	m^3	22,300
Ready mixed concrete (25-180-8)	m^3	59,000
Ready mixed concrete (25-300-15)	m^3	76,300
Precast concrete piles D400 × 65 × 10 m (class A)	m	22,000
Steel		
Mild steel reinforcement (over D16)	tonne	782,000
High tensile steel reinforcement (over D16)	tonne	800,000
Structural steel sections (rolled H beam)	tonne	860,000
Bricks and blocks		
Common bricks (190 × 90 × 57 mm)	1,000	56,250
Good quality facing bricks (190 × 90 × 57 mm)	1,000	500,000
Hollow concrete blocks (150 × 190 × 390 mm)	each	910
Autoclaved lightweight concrete blocks (600 × 400 × 100 mm)	each	15,900
Precast concrete cladding units with plain surface finish	m^2	56,000
Timber and insulation		
Softwood sections for carpentry	m^3	427,500
Softwood for joinery	m^3	1,467,000
Exterior quality plywood (15 mm)	m^2	7,200
Plywood for interior joinery (12 mm)	m^2	9,100
Softwood strip flooring (22 × 129 × 3700 mm)	m^2	111,000
Chipboard sheet flooring (18 × 200 × 2424 mm)	m^2	44,000
100 mm thick quilt insulation (mineral wool, 100 kg/m^3)	m^2	10,370
70 mm thick rigid slab insulation (expanded polystyrene)	m^2	11,450
Softwood internal door complete with frames and ironmongery	each	248,500
Glass and ceramics		
Tempered glass (10 mm)	m^2	24,250
Pair glass low-e (24 mm green)	m^2	45,400
Plaster and paint		
Good quality ceramic wall tiles (200 × 200 mm)	m^2	10,360
Plaster in 40 kg bags	bag	4,620
Plasterboard (9.5 mm thick)	m^2	1,870
Emulsion paint in 5 litre tins (white)	litre	9,930
Gloss oil paint in 5 litre tins (white)	litre	11,100
Tiles and paviors		
Clay floor tiles (200 × 200 × 7 mm)	m^2	11,000
Vinyl floor tiles (300 × 300 × 3 mm)	m^2	5,400
Precast concrete paving slabs (300 × 300 × 60 mm)	m^2	8,690
Clay roof tiles (360 × 345 × 13 mm)	1,000	1,580,000

Continued

	Unit	*Cost Won*
Precast concrete roof tiles (400 × 350 × 12 mm)	1,000	865,000
Granite 20–24 mm thick polished finish medium quality	m^2	29,100
Granite 20–24 mm thick polished finish high quality	m^2	87,500
Drainage		
WC suite complete	each	215,400
Lavatory basin complete	each	201,800
100 mm diameter PVC drain pipes	m	25,770
100 mm diameter cast iron drain pipes	m	18,455

Unit rates

The descriptions that follow are generally shortened versions of standard descriptions listed in full in Chapter 19. Where an item has a two-digit reference number (e.g. 05 or 33), this relates to the full description against that number in Chapter 19. Where an item has an alphabetic suffix (e.g. 12A or 34B), this indicates that the standard description has been modified. Where a modification is major, the complete modified description is included here and the standard description should be ignored; where a modification is minor (e.g. the insertion of a named hardwood), the shortened description has been modified here but, in general, the full description in Chapter 19 prevails.

The unit rates that follow are for main work items on a typical construction project in the Seoul and adjoining areas in the fourth quarter of 2013. The rates include all necessary labour, materials and equipment. Allowances to cover preliminary and general items and contractor's overheads and profit have been added to the rates. All the rates in this section exclude VAT.

		Unit	*Rate Won*
Excavation			
01	Mechanical excavation of foundation trenches	m^3	4,000
02	Hardcore filling making up levels	m^3	28,500
03	Earthwork support	m^2	117,000
Concrete work			
04	Plain *in situ* concrete in strip foundations in trenches	m^3	103,000
05	Reinforced *in situ* concrete in beds	m^3	103,000
06	Reinforced *in situ* concrete in walls	m^3	103,000

Continued

		Unit	*Rate Won*
07	Reinforced *in situ* concrete in suspended floors or roof slabs	m^3	103,000
08	Reinforced *in situ* concrete in columns	m^3	103,000
09	Reinforced *in situ* concrete in isolated beams	m^3	103,000
10	Precast concrete slabs	m^3	91,500
Formwork			
11	Softwood formwork to concrete walls	m^2	44,700
12	Softwood or metal formwork to concrete columns	m^2	52,900
13	Softwood or metal formwork to horizontal soffits of slabs	m^2	44,700
Reinforcement			
14	Reinforcement in concrete walls	tonne	1,400,000
15	Reinforcement in suspended concrete slabs	tonne	1,400,000
16	Fabric reinforcement in concrete beds	m^2	2,000
Steelwork			
17	Fabricate, supply and erect steel framed structure	tonne	2,580,000
18	Framed structural steelwork in universal joist sections	tonne	3,050,000
19	Structural steelwork lattice roof trusses	tonne	3,690,000
Brickwork and blockwork			
20	Precast lightweight aggregate hollow concrete block walls	m^2	70,000
21A	Solid (perforated) concrete blocks	m^2	51,000
23	Facing bricks	m^2	102,000
Roofing			
24	Concrete interlocking roof tiles 430 × 380 mm	m^2	51,000
25	Plain clay roof tiles 260 × 160 mm	m^2	46,000
26	Fibre cement roof slates 600 × 300 mm	m^2	47,000
27	Sawn softwood roof boarding	m^2	103,000
28	Particle board roof coverings	m^2	18,000
29	Three layers glass-fibre-based bitumen felt roof covering	m^2	41,000
30	Bitumen-based mastic asphalt roof covering	m^2	35,000
31A	Glass-fibre mat roof insulation 100 mm thick	m^2	25,000
32	Rigid sheet loadbearing roof insulation 75 mm thick	m^2	18,000
33	Troughed galvanised steel roof cladding	m^2	51,000
Woodwork and metalwork			
34	Preservative-treated sawn softwood 50 × 100 mm	m	18,000
35	Preservative-treated sawn softwood 50 × 150 mm	m	28,000

Continued

		Unit	*Rate Won*
36	Single glazed casement window in Lanan hardwood, size 650 × 900 mm	each	180,000
37	Two-panel glazed door in Lanan hardwood, size 850 × 2000 mm	each	450,000
38A	Solid core half hour fire resisting aluminium internal flush doors, size 800 × 2000 mm	each	1,420,000
39	Aluminium double glazed window, size 1200 × 1200 mm	each	460,000
40	Aluminium double glazed door, size 850 × 2100 mm	each	340,000
41A	Hardwood skirtings (Lanan)	m	18,000
Plumbing			
42	UPVC half round eaves gutter	m	22,000
43	UPVC rainwater pipes	m	30,000
44	Light gauge copper cold water tubing	m	67,000
45	High-pressure plastic pipes for cold water supply	m	20,000
46	Low-pressure plastic pipes for cold water distribution	m	20,000
47	UPVC soil and vent pipes	m	25,000
48	White vitreous China WC suite	each	220,000
49	White vitreous China lavatory basin	each	202,000
50	Glazed fireclay shower tray	each	225,000
51	Stainless steel single bowl sink and double drainer	each	375,000
Finishings			
55	Two coats gypsum-based plaster on brick walls	m^2	28,000
56	White glazed tiles on plaster walls	m^2	40,000
56A	Granite veneer 20 mm thick for walls, fixed with cement mortar	m^2	135,000
57	Red clay quarry tiles on concrete floors	m^2	43,000
58	Cement and sand screed to concrete floors	m^2	4,000
59	Thermoplastic floor tiles on screed	m^2	49,000
60	Mineral fibre tiles on concealed suspension system	m^2	31,000
Glazing			
61A	6 mm clear float glass; glazing to wood	m^2	25,000
Painting			
62	Emulsion on plaster walls	m^2	3,200
63	Oil paint on timber	m^2	4,200

Approximate estimating

The building costs per unit area that follow are averages incurred by building clients for typical buildings in the Seoul and adjoining areas as at the fourth quarter of 2013. They are based upon the total floor area of all storeys, measured between external walls and without deduction for internal walls.

Approximate estimating costs generally include mechanical and electrical installations but exclude furniture, loose or special equipment and external works; they also exclude fees for professional services. The costs shown are for specifications and standards appropriate to South Korea and this should be borne in mind when attempting comparisons with similarly described building types in other countries. A discussion of this issue is included in Chapter 2. Comparative data for countries covered in this publication, including construction cost data are presented in Part III.

Approximate estimating costs must be treated with caution; they cannot provide more than a rough guide to the probable cost of building. All the rates in this section exclude VAT.

	Cost m² Won	*Cost ft²* Won
Industrial buildings		
Factories for letting	700,000	65,000
Factories for owner occupation (light industrial use)	780,000	72,500
Factories for owner occupation (heavy industrial use)	825,000	76,600
Factory/office (high tech) for letting (shell and core only)	1,100,000	102,200
Factory/office (high tech) for letting (ground floor shell, first floor offices)	1,150,000	106,800
Factory/office (high tech) for owner occupation (controlled environment, fully finished)	1,200,000	111,500
High tech laboratory workshop centres (air-conditioned)	1,250,000	116,100
Warehouses, low bay (6–8 m high) for letting (no heating)	610,000	56,700
Warehouses, low bay for owner occupation (including heating)	700,000	65,000
Warehouses, high bay for owner occupation (including heating)	750,000	69,700
Cold stores/refrigerated stores	1,500,000	139,400
Administrative and commercial buildings		
Civic offices, non-air-conditioned	1,150,000	106,800
Civic offices, fully air-conditioned	1,250,000	116,100
Offices for letting, 5–10 storeys, non-air-conditioned	1,150,000	106,800
Offices for letting, 5–10 storeys, air-conditioned	1,250,000	116,100
Offices for letting, high rise, air-conditioned	1,450,000	134,700

Continued

	Cost m² *Won*	*Cost ft²* *Won*
Offices for owner occupation 5–10 storeys, non-air-conditioned	1,250,000	116,000
Offices for owner occupation 5–10 storeys, air-conditioned	1,350,000	125,400
Offices for owner occupation high rise, air-conditioned	1,700,000	158,000
Prestige/headquarters office, 5–10 storeys, air-conditioned	1,600,000	148,600
Prestige/headquarters office, high rise, air-conditioned	1,650,000	153,500
Health and education buildings		
General hospitals (100 beds)	1,800,000	167,200
Teaching hospitals (100 beds)	1,600,000	148,600
Private hospitals (100 beds)	1,450,000	134,700
Health centres	1,400,000	130,100
Nursery schools	1,180,000	109,600
Primary/junior schools	1,200,000	111,500
Secondary/middle schools	1,200,000	111,500
University (arts) buildings	1,250,000	116,100
University (science) buildings	1,350,000	125,400
Management training centres	1,350,000	125,400
Recreation and arts buildings		
Theatres (>500 seats) including seating and stage equipment	2,600,000	241,500
Theatres (<500 seats) including seating and stage equipment	2,650,000	246,200
Concert halls including seating and stage equipment	2,710,000	251,800
Sports halls including changing and social facilities	2,000,000	185,800
Swimming pools (international standard) including changing and social facilities	1,850,000	171,900
Swimming pools (school standard) including changing facilities	1,850,000	171,900
National museums including full air-conditioning and standby generator	1,750,000	162,600
Local museums including air-conditioning	1,650,000	153,300
Branch/local libraries	1,400,000	130,100
Residential buildings		
Social/economic single family housing (multiple units)	1,200,000	111,500
Private/mass market single family housing 2-storey detached/semi-detached (multiple units)	1,350,000	125,400
Purpose designed single family housing 2-storey detached (single unit)	1,950,000	181,200
Social/economic apartment housing, low rise (no lifts)	1,050,000	97,500
Social/economic apartment housing, high rise (with lifts)	1,250,000	116,100
Private sector apartment building (standard specification)	1,500,000	139,400

Continued

	Cost m² *Won*	*Cost ft²* *Won*
Private sector apartment buildings (luxury)	1,870,000	173,700
Student/nurses halls of residence	1,300,000	120,800
Homes for the elderly (shared accommodation)	1,350,000	125,400
Homes for the elderly (self-contained with shared communal facilities)	1,550,000	144,000
Hotel, 5 star, city centre	2,700,000	250,800
Hotel, 3 star, city/provincial	2,000,000	185,800
Motel	1,700,000	157,900

Regional variations

The approximate estimating costs are based on projects in Seoul and other big cities. For other parts of country, add 5% to these costs.

Value added tax

The standard rate of VAT is currently 10%, chargeable on general building work.

EXCHANGE RATES AND INFLATION

The combined effect of exchange rates and inflation on prices within a country and price comparisons between countries are discussed in Chapter 2.

Exchange rates

Figure 14.1 plots the movement of the South Korean won against the sterling, the euro, the US dollar and 100 Japanese yen since 2003. The values used in the figure are quarterly and the method of calculating these is described and general guidance on the interpretation of the figure are provided in Chapter 2. The average exchange rate in the fourth quarter of 2013 was W1,719 to pound sterling, W1,446 to euro, W1,062 to US dollar and W1,057 to 100 Japanese yen.

Price inflation

Table 14.4 presents consumer prices in South Korea since 2008.

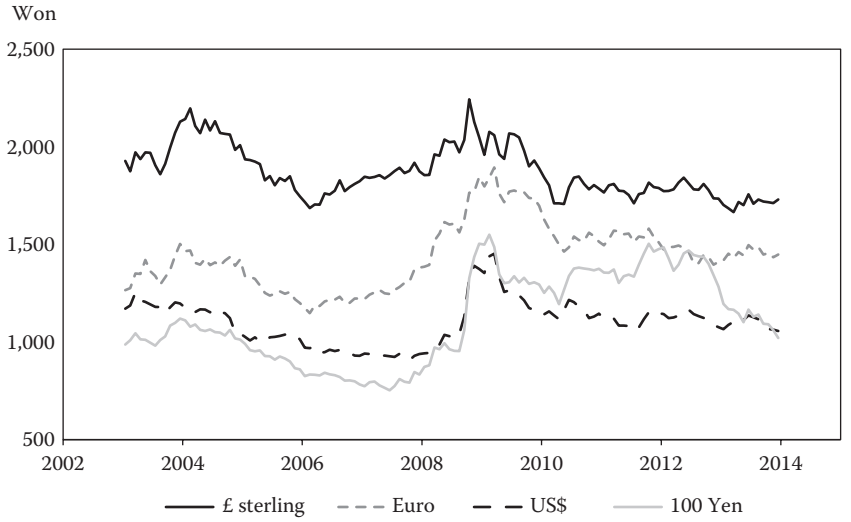


Figure 14.1 The South Korean won against sterling, euro, US dollar and 100 Japanese yen.

Table 14.4 Consumer price inflation

	Consumer price index	
Year	*Average index*	*Average change %*
2008	94.77	4.3
2009	96.89	2.2
2010	100.00	3.2
2011	103.54	3.5
2012	104.90	1.3
2013	105.72	0.8

Source: Korean Statistical Information Service.

USEFUL ADDRESSES

Public Organisations

Korea Institute of Construction Technology
283 Goyangdae-ro,
Ilsanseo-Gu, Goyang-si,
Gyeonggi-Do, 411-712, KOREA
Tel: (82) 31 9100 282 0282
E-mail: Webmaster@kict.re.kr
Website: www.kict.re.kr

Korea Land & Housing Corporation
172 Dolmaro (217 Jungja-Dong),
Bundang-Gu, Sungnam-Si,
Kyungki-do 463-755, KOREA
Tel: (82) 31 738 7114
Website: world.lh.or.kr

Korea National Statistical Office
Government Complex-Daejeon,
189 Cheongsa-ro, Seo-gu, Daejeon,
302-701, KOREA
Tel: (82) 2 2012 9114
Website: www.kostat.go.kr

Korean Standards Association
Korea Technology Centre,
701-7 Yeoksam-Dong, Gangnam-Gu,
Seoul 135-513, KOREA
Tel: (82) 2 6009 4513
Fax: (82) 2 6009 4006
Website: www.ksa.or.kr

Ministry of Land, Infrastructure and Transport
11 Doum 6-ro, Government Complex-Sejong,
Sejong-si 339-012, KOREA
Tel: (82) 44 1599 0001 (Day)/(82) 44 201 4672 (Night)
Fax: (82) 44 860 9500 (Day)/(82) 44 201 5700 (Night)
Website: www.molit.go.kr

Ministry of Strategy and Finance
Government Complex-Sejong,
477, Galmae-ro, Sejong Special Self-Governing City,
339-012, KOREA
Tel: (82) 44 215 2114
E-mail: fppr@mosf.go.kr
Website: www.mosf.go.kr

Trade and Professional Organisations

Architectural Institute of Korea
1044-34 Sadang-Dong,
Dongjak-Gu, Seoul, KOREA 156-827
Tel: (82) 2 525 1841~4
Fax: (82) 2 525 1845
E-mail: webmaster@aik.or.kr
Website: www.aik.or.kr

Construction Association of Korea
7-8F The Hall of Construction B/D,
71-2 Nonhyun-Dong, Kangnam-Gu,
Seoul, KOREA 135-701
Tel: (82) 2 1588 6912
E-mail: webmaster@cak.or.kr
Website: www.cak.or.kr

The International Contractors Association of Korea
13F, 42 Sejongdae-ro 9-gil,
Jung-gu, Seoul, KOREA
Tel: (82) 2 3406 1114
Fax: (82) 2 3406 1120
Website: www.icak.or.kr

Korea Construction Engineers Association
650, Eonju-ro, Gangnam-gu,
Seoul, KOREA 135-830
Tel: (82) 1577-5445
Website: www.kocea.or.kr

Korea Engineering & Consulting Association
1049-1 Sadong-Dong, Dongjak-Gu,
Seoul 156-090 KOREA
Tel: (82) 2 3019 3200
Fax: (82) 2 3019 3300
E-mail: engineering@kenca.or.kr
Website: www.kenca.or.kr

Korea Housing Builders Association
4, 5F, Korea Housing Center Bldg.,
25, Gukjegeumyung-ro 8-gil, Yeongdeungpo-gu,
Seoul, KOREA 150-736
Tel: (82) 2 785 0990
Fax: (82) 2 785 3915
Website: www.khba.or.kr

Korea Institute of Registered Architects
1603-55, Seocho1-dong,
Secho-gu, Seoul, KOREA
Tel: (82) 2 3415 6800
Fax: (82) 2 3415 6898~9
Website: www.kira.or.kr

Korea Research Institute for Human Settlements
254 Simin-daero, Dongan-gu, Anyang-si,
Gyeonggi-do, KOREA 431-712
Tel: (82) 31 380 0114
Fax: (82) 31 380 0470
Website: www.krihs.re.kr

Korean Professional Engineer Association
#635-4, Yeoksam-Dong, Gangnam-Gu,
Seoul, KOREA, 135-703
Tel: (82) 2 566 5874~5/566 5886~7
Fax: (82) 2 557 7408
E-mail: kpea@kpea.or.kr
Website: www.kpea.or.kr

Others

Korea Development Bank
14 Eunhaeng-ro, Yeongdeungpo-gu,
Seoul, KOREA 150-973
Tel: (82) 2 1588 1500
Website: www.kdb.co.kr

Korea Housing Association
Kunsul Bldg, 4th floor,
71-2 Nonhyun-Dong,
Gangnam-Gu, Seoul, KOREA
Tel: (82) 2 512 0191
Fax: (82) 2 511 6974
E-mail: webmaster@housing.or.kr
Website: www.housing.or.kr

Chapter 15

Sri Lanka

All data relate to 2013 unless otherwise indicated.

Population	
Population	20.5 mn
Urban population	15.13%
Population under 15	25%
Population 65 and over	8%
Average annual growth rate	0.8%
Geography	
Land area	65,610 km^2
Agricultural area	36%
Commercial capital	Colombo
Capital	Sri Jayawardanapura Kotte
Population of capital city	2.3 mn
Economy	
Monetary unit	Sri Lanka rupee (LKR)
Exchange rate (average fourth quarter of 2013)	
The pound sterling	LKR 212.13
The US dollar	LKR 131.00
The euro	LKR 178.30
The yen × 100	LKR 130.53
Average annual inflation	6.9%
Inflation rate	4.7%
Gross domestic product (GDP) at current market price	LKR 8,674 bn
GDP at constant price	LKR 3,178 bn
GDP per capita	LKR 423,467
Average annual real change in GDP	7.3%
Private consumption as a proportion of GDP	66.8%
Public consumption as a proportion of GDP	13.1%

Continued

Investment as a proportion of GDP	29.6%
Construction	
Gross value of construction output	LKR 894.7 bn
Net value of construction output	LKR 282.7 bn
Net value of construction output as a proportion of GDP (at constant price)	8.9%

THE CONSTRUCTION INDUSTRY

The construction industry is a sub-sector of the industry sector of Sri Lanka. The developments of the key sectors and their sub-sectors are linked with construction sector directly or indirectly as the construction involves with almost all the other sectors and sub-sectors. Therefore, construction industry plays a major role in the process of development in the country.

The construction sector consists of building construction and civil engineering construction. The civil engineering construction includes roads, highways, bridges, ports and air ports, water supply and drainage, irrigation, power plants and all other construction/infrastructure work except building construction.

Donations are received as concessionary loans for the development of construction industry in Sri Lanka. The objective of this development is to strengthen the capacity and improve the ability of the construction industry through rehabilitation of infrastructure, purchase of construction equipment and also utilisation of working capital requirements of the small and medium entrepreneurs in the sector and strengthen the management competence and technical capacity of the employees in the construction sector.

The industry consists of two sectors namely the formal sector and the informal sector. The real output of informal sector is hardly quantified. Small-scale social building and infrastructure work are carried out by the people themselves or by appointing labour-only contractors. The information on this type of '*ad hoc*' involvements in construction sector are not properly recorded anywhere.

Government policy towards construction

Rapid development of basic infrastructure is a key policy objective of the year 2006–2016. Investment in power generation and distribution, port and airport development, expressways and national highway network, water supply and urban facilities, irrigation and agricultural infrastructure and downstream development activities and improvements in railway infrastructure are some of the areas of investment.

The Government has implemented schemes to generate more work for the industry locally initiated or foreign funded. It is determined to ensure that the projects funded by the World Bank, International Monetary Fund (IMF), Asian Development Bank (ADB) and others are channelled properly, performed and brought into the local economy.

The main priority of the Government is the provision of social housing and infrastructure development. The Urban Development Authority (UDA) and National Housing Development Authority (NHDA) with Ministry of Construction and Engineering Services are tasked with the implementation of housing programmes using public resources. Apart from the involvement of NHDA, several low-cost housing programmes have also been implemented by private developers under BOI (Board of Investment) duty free concessions to meet the housing needs in the country.

National Housing Policy of house ownership for all, through the target of constructing 600,000 houses by 2016, mainly targeting low- and middle-income families as well as high-income families. These include construction of new houses, rehabilitation of existing houses, relocation from low-quality housing, promote to construct their own houses.

The strategy of urban development in Sri Lanka focussed on developing both economic and social infrastructure to provide holistic living and working environment for the people. Therefore, high priority is given to provide facilities for business activities, public utilities, township development, improved housing facilities, recreational facilities and urban beautification programme by constructing walkways and rehabilitation of roads, parks, restaurants, commercial centres, recreational facilities and solid waste management to create healthy urban society.

As per National Infrastructure Development Programme – Urban Development and Township 2006–2016, the construction projects in the pipe line for 2008–2015 include the construction of 17 flyovers at strategically selected junctions in Colombo City and suburbs to reduce traffic congestion, reconstruction of 222 bridges on National Highways and Provincial and Rural Roads, 'Janasevena' Housing Programme to construct 25 houses in each village at the rate of 15,000 housing units per year between 2006 and 2012, post Tsunami Housing Reconstruction Programme to provide 114,000 shelters for Tsunami affected families in the coastal belt, construction of houses for the displaced families and 50,000 houses for estate workers' families to uplift their living condition, townships for service personnel by constructing 1,700 housing units, and housing for urban under-served families on concessionary terms for about 2,700 families living in underserved settlements in Colombo and suburbs.

The Government encourages private sector investment in infrastructure development projects such as water supply, wastewater disposal, power generation, roads, industrial estates, car parks and buildings. Both local

and foreign investors are encouraged to participate in infrastructure and property development through various Government schemes and policies of the country by offering concessions. Inflows to the country through foreign direct investment (FDI), loans, and the like were mainly directed to finance major infrastructure projects supporting long-term development goals of the country.

Arrangements for Public Private Partnerships (PPP) are also another move by the Government in the construction industry in Sri Lanka.

The Construction Industry Development Act presented by the Chamber of Construction Industry Sri Lanka is to be adopted soon to tackle problems faced by the domestic construction industry. This new act has been formulated as an alternative to the Construction Industry Authority Act, currently in force, which only deals with regulations. The proposed legislation contains provisions for the establishment of a construction industry authority as a regulating body. This will also address the needs to provide uniform treatment related to unsolicited developments involving construction contracts and strict adherence to environmental standards.

Construction output

The construction sub-sector of the industry sector has been substantially contributed to the economic growth of the country in the year 2012 as revealed by the Central Bank report of Sri Lanka. The industry sector is the main driving force of the economic growth of the country which contributed 30.4% of the total GDP, compared to 29.3% in the year 2011 and the construction sub-sector contributed 8.1% of the overall GDP.

The industry sector grew by 10.3% in the year 2012 mainly due to the acceleration in the construction sub-sector. The construction sub-sector achieved 21.6% growth in the year 2012 upped from 14.2% growth rate in the year 2011. This growth in the construction sub-sector is due to the continuation of major Government funded infrastructure development projects and increased construction activities of the private sector, including tourism-related new construction and renovation activities. In construction sub-sector, gross average growth rate of 22.3% has been recorded per year during the period between the years 2008 and 2012 with the highest growth rate of 39.3% recorded in the year 2012. This was the peak in construction sub-sector growth.

The gross value of construction output in the year 2012 was LKR 712.3 billion equivalent to US$5.58 billion or 9.39% of GDP. The net value of construction output in the year 2012 was LKR 247 billion equivalent to US$1.94 billion or 3.26% of GDP. Table 15.1 clearly indicates the changes in the growth rate in construction output (as a proportion of GDP) from the year 2008 to 2013.

Table 15.1 Composition of GDP at current prices 2008–2013

Element/year	*2008*	*2009*	*2010*	*2011*	*2012*	*2013*
GDP	4,410,682	4,835,293	5,604,104	6,544,009	7,578,554	8,673,870
GDP growth rate (%)	–	9.6	15.9	16.8	15.8	14.4
Construction output	327,138	366,428	423,414	511,220	712,272	894,683
Growth rate (construction)	–	12.0	15.6	20.8	39.3	25.6

Source: Central Bank of Sri Lanka.

The published data on the breakdown of construction volume is not available for recent years. However, according to a survey conducted by the Department of Census and Statistic in year 2010, revealed that 53% of the total volume of contracts was related to building construction and the remaining was contributed by infrastructure works such as roads, highways, bridges, water supply, power plants, airports, irrigation and the like. The statistics indicated proportion of the investment for public sector and private sector at 66% and 34%, respectively. Out of all the types of construction works carried out by contractors registered with the Institute for Construction Training and Development (ICTAD) in year 2010, 48% were building works, 32% were highway construction works and the remaining 20% were compositely in the categories of bridge construction, water supply and drainage, irrigation and land drainage, dredging and reclamation and other construction.

Major projects in progress

There are many new condominium (condo)/luxury apartments and housing complex development and future property development projects in Sri Lanka developed by local/foreign private clients. All these apartments are high-rise buildings and develop mainly within Colombo and Colombo suburbs.

The development of infrastructure is also utmost important to improve the economic productivity of the country. Therefore many infrastructure projects have commenced and are still in progress today. The development policy of the Government directed to implement construction of ports, several fishery harbours, new international airports, power plants, new roads and irrigation schemes to continue support for the expansion of the economy.

Major airport projects under transport infrastructure include the modernisation of Bandaranayake International Airport, development of domestic airports at Ampara, Koggala, Chinabay, Jaffna and Ratmalana as city airports. The construction of Hambanthota International Airport in Mattala has completed and opened for operations.

Colombo, Galle, Trincomalee, Kankasanthurai and Point Pedro are main sea ports in Sri Lanka and phase one of Hambanthota port has completed and opened for operations.

Major road development projects which are currently in progress are the Southern expressway, Colombo – Katunayake expressway, new circular highway connecting Southern expressway and Colombo – Kandy expressway and development of road network in Northern and Eastern provinces.

Reconstruction of railway line from Mawachchiya to Thalaimannar and reconstruction of 145 km of the line from Omanthai to Kankasanthurai are examples of some of the major railway development projects.

In addition to the above, recreation and urban beautification projects have also been implemented in most of the areas in the country by constructing walkways, rehabilitation of roads, parks, restaurants, commercial centres, recreational facilities and proper waste management.

Registered construction companies

Most of the contractors in the industry are privately owned companies and they are registered with ICTAD under the following grades (other than international contractors) based on financial limits. As of March 2013, there are 9,665 registered companies as given in Table 15.2.

Table 15.2 Number of registered companies by grade, 2013

Registration grade	*Limit of project size*	*Number of registered companies*
Building construction		
Grade C1	LKR 600 million and above	23
Grade C2	LKR 300–600 million	27
Grade C3	LKR 150–300 million	56
Grade C4	LKR 50–150 million	102
Grade C5	LKR 25–50 million	177
Grade C6	LKR 10–25 million	284
Grade C7	LKR 5–10 million	1,371
Grade C8	LKR 2–5 million	357
Grade C9	<LKR 2 million	81
Grade C10	<LKR 1 million	21
Total		2,499
Highway construction		
Grade C1	LKR 600 million and above	24
Grade C2	LKR 300–600 million	17
Grade C3	LKR 150–300 million	28
Grade C4	LKR 50–150 million	69

Continued

Table 15.2 (*Continued*) Number of registered companies by grade, 2013

Registration grade	*Limit of project size*	*Number of registered companies*
Grade C5	LKR 25–50 million	121
Grade C6	LKR 10–25 million	173
Grade C7	LKR 5–10 million	1,562
Grade C8	LKR 2–5 million	342
Grade C9	<LKR 2 million	70
Grade C10	<LKR 1 million	20
Total		2,426
Dredging and reclamation		
Grade C1	LKR 600 million and above	3
Grade C2	LKR 300–600 million	1
Grade C3	LKR 150–300 million	2
Grade C4	LKR 50–150 million	5
Grade C5	LKR 25–50 million	3
Grade C6	LKR 10–25 million	6
Grade C7	LKR 5–10 million	859
Grade C8	LKR 2–5 million	201
Grade C9	<LKR 2 million	66
Grade C10	<LKR 1 million	17
Total		1,163
Irrigation and land drainage		
Grade C1	LKR 600 million and above	3
Grade C2	LKR 300–600 million	5
Grade C3	LKR 150–300 million	10
Grade C4	LKR 50–150 million	22
Grade C5	LKR 25–50 million	12
Grade C6	LKR 10–25 million	84
Grade C7	LKR 5–10 million	367
Grade C8	LKR 2–5 million	322
Grade C9	<LKR 2 million	65
Grade C10	<LKR 1 million	19
Total		909
Water supply and drainage		
Grade C1	LKR 600 million and above	10
Grade C2	LKR 300–600 million	8
Grade C3	LKR 150–300 million	16
Grade C4	LKR 50–150 million	28
Grade C5	LKR 25–50 million	25

Continued

Table 15.2 (*Continued*) Number of registered companies by grade, 2013

Registration grade	*Limit of project size*	*Number of registered companies*
Grade C6	LKR 10–25 million	26
Grade C7	LKR 5–10 million	1,320
Grade C8	LKR 2–5 million	319
Grade C9	<LKR 2 million	69
Grade C10	<LKR 1 million	17
Total		1,838
Bridge construction		
Grade C1	LKR 600 million and above	7
Grade C2	LKR 300–600 million	3
Grade C3	LKR 150–300 million	19
Grade C4	LKR 50–150 million	16
Grade C5	LKR 25–50 million	18
Grade C6	LKR 10–25 million	32
Grade C7	LKR 5–10 million	236
Grade C8	LKR 2–5 million	1
Grade C9	<LKR 2 million	0
Grade C10	<LKR 1 million	0
Total		332
Storm Water		
Grade C1	LKR 600 million and above	1
Grade C2	LKR 300–600 million	2
Grade C3	LKR 150–300 million	5
Grade C4	LKR 50–150 million	6
Grade C5	LKR 25–50 million	7
Grade C6	LKR 10–25 million	6
Grade C7	LKR 5–10 million	152
Grade C8	LKR 2–5 million	16
Grade C9	<LKR 2 million	5
Grade C10	<LKR 1 million	1
Total		201
Groynes and revetments		
Grade C1	LKR 600 million and above	1
Grade C2	LKR 300–600 million	1
Grade C3	LKR 150–300 million	1
Grade C4	LKR 50–150 million	1
Grade C5	LKR 25–50 million	0
Grade C6	LKR 10–25 million	1
Grade C7	LKR 5–10 million	20

Continued

Table 15.2 (*Continued*) Number of registered companies by grade, 2013

Registration grade	*Limit of project size*	*Number of registered companies*
Grade C8	LKR 2–5 million	1
Grade C9	<LKR 2 million	0
Grade C10	<LKR 1 million	0
Total		26
Specialised contractors		
Grade EM1	LKR 50 million and above	78
Grade EM2	LKR 25–50 million	14
Grade EM3	LKR 10–25 million	7
Grade EM4	LKR 2–10 million	43
Grade EM5	<LKR 2 million	81
Grade SP-1	LKR 50 million and above	5
Grade SP-2	LKR 25–50 million	1
Grade SP-3	LKR 10–25 million	4
Grade SP-4	LKR 2–10 million	19
Grade SP-5	<LKR 2 million	10
Grade GP-P	LKR 50 million and above	2
Grade GP-B1	LKR 150 million and above	6
Grade GP-B2	LKR 50–150 million	0
Grade GP-B3	LKR 10–50 million	1
Grade GP-B4	<LKR 10 million	0
Total		271

Source: Institute for Construction Training and Development.

The fields of specialisation for main contractors comprise building, highways, bridges, water supply and drainage, irrigation and land drainage, dredging and reclamation, Groynes and revetments, storm water and specialist contractors (building services, piling and finishes).

Registration grade	*Limit of project size*	*Number of registered companies*
Grade C1	LKR 600 million and above	72
Grade C2	LKR 300–600 million	64
Grade C3	LKR 150–300 million	137
Grade C4	LKR 50–150 million	249
Grade C5	LKR 25–50 million	363
Grade C6	LKR 10–25 million	612
Grade C7	LKR 5–10 million	5,887
Grade C8	LKR 2–5 million	1,559

Continued

Registration grade	*Limit of project size*	*Number of registered companies*
Grade C9	<LKR 2 million	356
Grade C10	<LKR 1 million	95
Grade EM1	LKR 50 million and above	78
Grade EM2	LKR 25–50 million	14
Grade EM3	LKR 10–25 million	7
Grade EM4	LKR 2–10 million	43
Grade EM5	<LKR 2 million	81
Grade SP1	LKR 50 million and above	5
Grade SP2	LKR 25–50 million	1
Grade SP3	LKR 10–25 million	4
Grade SP4	LKR 2–10 million	19
Grade SP5	<LKR 2 million	10
Grade GP-P	LKR 50 million and above	2
Grade GP-B1	LKR 150 million and above	6
Grade GP-B2	LKR 50–150 million	0
Grade GP-B3	LKR 10–50 million	1
Grade GP-B4	<LKR 10 million	0
Total		9,665

Source: Institute for Construction Training and Development.

Registered main contractors who have done major contracts in Sri Lanka are:

- State Engineering Corporation of Sri Lanka
- State Development and Construction Corporation
- Access Engineering PLC
- International Construction Consortium (Pvt) Ltd
- Tudawe Brothers (Pvt) Ltd
- Daya Construction (Pvt) Ltd
- LH Piyasena and Company (Pvt) Ltd
- Maga Engineering (Pvt) Ltd
- N & A Engineering Services
- Nawaloka Construction Company (Pvt) Ltd
- RN Construction (Pvt) Ltd
- RR Construction (Pvt) Ltd
- Sanken Construction (Pvt) Ltd
- VV Karunarathna & Company
- Sierra Construction (Pvt) Ltd
- CML-MTD Construction Ltd
- HOVAEL Construction (Pvt) Ltd
- Consulting Engineers and Contractors (Pvt) Ltd

- NEM Construction (Pvt) Ltd
- Isuru Engineering (Pvt) Ltd
- Nuwani Construction (Pvt) Ltd
- Orient Construction Company
- Sathuta Builders (Pvt) Ltd
- Sripalie Contractors (Pvt) Ltd

Clients and project funding

Until the early 1980s, the Sri Lankan construction industry has been dominated by the public sector. However, since the mid-1980s, with the free economy, there is a marked shift towards the private sector and a gradual decline of the importance of the state sector. The value addition to the construction sector is estimated to have grown considerably in the past. The growth impetus in this sector came from both Government sector spending on public infrastructure facilities and private sector involvement in construction activities, particularly in condominium projects and private housing units.

Infrastructure projects, which are not identified to be financed by consolidated funds, has to be financed or developed by private investors. Projects financed by the private sector will be considered on a Build, Own and Operate (BOO), Build, Owned and Transfer (BOT), Build, Owned, Operate and Transfer (BOOT) and variant build, own and operated by investor or transferred or leased to the public sector after the concession period.

Approving authority for award of a BOO/BOT project is the Cabinet and all matters pertaining to BOO/BOT projects should be channelled through a Cabinet Appointed Negotiating Committee (CANC) assisted by Project Committee (PC).

Infrastructure development projects managed by the private sector on BOO/BOT or other variant basis, which will be wholly or partly implemented by the private sector include but are not limited to power plants, highways/expressways, ports, airports, telecommunications, railways, transport system, industrial parks, solid waste management, water supply and drainage, ware houses, housing markets, land reclamation and other economic infrastructure.

Consultancy services

Building work has been administered by professional consultants appointed by the building client. The consultancy field in the construction industry was largely non-existent prior to 1970 except for a few architectural practices which catered to the private sector. The consultants are responsible for the design and contract administration and the supervision of the project. Of late, design-and-build contractors offering a single point responsibility have been introduced to the industry, especially in the industrial

building sector. Other non-traditional forms of arrangements are also beginning to emerge. Design work is undertaken mainly by architects and engineers. Majority of the architects are members of the Sri Lanka Institute of Architects (a professional body governing the practice of architecture). A large number of the institute's members are working in the private sector as partners or hold senior positions while the remainders work in the government, education or semi-governmental bodies.

Civil engineers are members of the Institution of Engineers Sri Lanka (a professional body governing the practice of engineering).

The quantity surveyor has established its prominence in Sri Lanka with the chartered status incorporated in the parliament of Sri Lanka with the introduction of undergraduate programmes in the Universities in the mid-1980s. The services offered by a quantity surveyor are very much appreciated by the industry. The profession has now gained its statutory recognition and approval.

Selection of design consultants

ICTAD is in the process of revising its consultancy documents and this revision of the consultancy documents was made essentially to denote more precisely, the activities pertaining to the different disciplines, and to reduce overlapping of functions as far as possible. It is expected that the revised documents would guide both the client and the consultants in the choice of the consultant and the services assigned to them.

The services provided by each profession was categorised under the following three headings:

a. Basic services relevant to the profession
b. Extra services pertaining to the profession
c. Other services which are not pertaining to the particular profession that could be provided on special assignments

In the public sector, a pre-qualification exercise through the submission of credentials and relevant experience followed by interviews is the norm. In some instances, a design competition is held. Private clients, on the other hand, may select the design consultants known to them or from those who have a reputation for a specific type of building. The fee is based on a scale stipulated by the respective professional organisation.

Contractual arrangements

The *ICTAD Standard Form of Contract* is the standard document widely accepted by the industry and its use is mandatory for all public sector projects. The most common type of contract assumes the use of measured

bills of quantities that are normally prepared by the quantity surveyor. The tender documentation structure under this form comprises the following:

- Form of tender
- Conditions of tender
- Drawings
- Specifications
- Bills of quantities, schedules of works or schedules of rates

Procurement of all public works and services are now governed by the *Guidelines on Government Tender Procedure (revised edition August 1997)* published by the Ministry of Finance and Planning. These guidelines also provide a comprehensive procedure to be followed when dealing with BOO/BOT projects.

In addition to these forms of contracts, independent consultants have documented their own bespoke forms based on common standard forms of contract such as JCT, FIDIC, and the like and most overseas clients investing for property development here used amended versions of these documents to suit their requirements.

Contracts are usually let on a measure and pay basis. Fluctuations in labour, materials and plant costs are reimbursed. Such increases in costs are paid according to a formula, which is based on input percentages and indices published by ICTAD.

There are a number of alternative contractual arrangements – most notably management contracting, design-and-build, construction management and guaranteed maximum price. With respect to design-and-build procurement, a publication of the conditions of contract is available from ICTAD. Under management contracting, the client enters into a separate contract with a designer and a management contractor who in turn enters into subcontracts with individual works contractors. For construction management, the client enters into separate contracts with a designer, a construction manager and the works contractors. This form of contractual arrangement is increasingly being used in preference to management contracting.

Liability and insurance

Almost all professional practices do not carry professional indemnity insurance, probably for the reason that no major legal proceedings have been pursued against such firms.

Dispute resolution in construction has been made faster with the newly introduced Arbitration Act in Sri Lanka. The Sri Lanka National Arbitration Centre is the oldest institution in the country for resolution of construction and commercial disputes whereas the Institution of Commercial Law & Practice is a fairly new facility for conducting dispute resolution.

Development control and standards

The UDA is the national planning authority regulating and facilitating the physical development of Sri Lanka. All types of development require written planning permission and this covers obtaining clearance for reports on traffic impact assessment and environmental impact assessment.

The industry-specific standards which apply to the whole industry are promulgated by ICTAD, Sri Lankan Standards Institution (SLSI) and the Road Development Authority (RDA). ICTAD standards are applicable to both building and civil engineering works.

The Sri Lanka Standards Institution draws up and promulgates the *Sri Lanka Standards (SLS*), the standard specification for products, and it is usual for manufacturers to comply with these standards.

Architects and other building professionals generally follow the recommendations of the SLS or in its absence the BS specifications when specifying building products. In addition to these standards, other codes such as the Fire Code and Energy Efficient Code are in place for controlling building standards.

A Construction Industry Authority Act is now in force to give effect to state policies on construction which dealt with regulation and are aimed at increasing the efficiency of the construction industry, and make it more responsible for the national development efforts and economic needs of the country. This has been implemented by ICTAD who will be given a much greater responsibility and authority to establish itself as the authority for the construction industry. There will soon be an Act called the Construction Industry Development Act presented by the Chamber of Construction Industry Sri Lanka that addresses security of payments to contractors and consultants, occupation health and safety standards to be adhered to by those undertaking construction contracts.

Research and development

The main organisations engaged in construction research are ICTAD, the Building Economics and Management Research Unit (BEMRU) of the University of Moratuwa, the University of Peradeniya and National Building Research Organization (NBRO). The addresses are given under the useful addresses section.

Future prospects

By 2010/2015, the construction sector is expected to grow by around 7%–8% as in previous year with active participation of the private sector as well as the public sector. Public sector activities are expected to increase with the on-going and proposed pipeline of infrastructure projects in the

areas of electricity generation and development of transport infrastructure. The private sector is also expected to focus on housing construction including condominiums and apartment complexes.

CONSTRUCTION COST DATA

Cost of labour

The figures that follow are typical of labour costs in the Western Province (Colombo and its suburbs) as at the fourth quarter of 2013. The wage rate is on the basis of an employee's income, while the cost of labour (all-in rates) indicates the cost to a contractor employing that employee. The difference between the two covers a variety of contributions – among them are EPF (Employees Provident Fund), ETF (Employees Trust Fund), holidays, bonus, insurance, welfare, training, uniforms and any other fringe benefits.

	Wage rate (per day) LKR	*Cost of labour (per day) LKR*	*Number of worked hours per year*
Site operatives			
Mason/bricklayer	1,200	1,800	2,038
Carpenter	1,200	1,800	2,038
Plumber	1,200	1,800	2,038
Electrician	1,400	2,000	2,038
Structural steel erector	1,400	2,000	2,038
HVAC installer	1,400	2,000	2,038
Semi-skilled worker	1,000	1,500	2,038
Unskilled labourer	900	1,400	2,038
Equipment operator	1,200	1,800	2,038
Watchman/security	1,000	1,500	2,038
Site supervision	*(per month)*	*(per month)*	
General foreman	40,000	75,000	2,160
Trades foreman	45,000	80,000	2,160
Clerk of works	40,000	75,000	2,160
Contractors' personnel			
Site manager	150,000	225,000	2,160
Resident engineer	150,000	225,000	2,160
Resident surveyor	100,000	170,000	2,160
Junior engineer	60,000	100,000	2,160
Junior surveyor	60,000	100,000	2,160
Planner	70,000	110,000	2,160

Continued

	Wage rate (per month) LKR	*Cost of labour (per month) LKR*	*Number of worked hours per year*
Consultants' personnel			
Senior architect	175,000	275,000	1,920
Senior engineer	175,000	275,000	1,920
Senior surveyor	160,000	210,000	1,920
Qualified architect	80,000	125,000	1,920
Qualified engineer	80,000	125,000	1,920
Qualified surveyor	80,000	125,000	1,920

Note: Wages for site supervision/contractor's personnel/consultants personnel are based on private sector salary structure (top range).

Cost of materials

The figures that follow are the costs of main construction materials, delivered to site in Colombo city area, as incurred by the contractors in the fourth quarter of 2013. These assume that the materials would be in quantities as required for a medium-sized construction project and that the location of the works would be neither constrained nor remote.

All the costs in this section exclude value added tax (VAT).

	Unit	*Cost LKR*
Cement and aggregate		
Ordinary Portland cement in 50 kg bags	tonne	16,650
Coarse aggregate for concrete (20 mm)	m^3	2,900
Fine aggregates for concrete	m^3	3,500
Ready mixed concrete (15 N/mm^2)	m^3	11,500
Ready mixed concrete (20 N/mm^2)	m^3	11,800
Ready mixed concrete (25 N/mm^2)	m^3	12,300
Ready mixed concrete (30 N/mm^2)	m^3	13,100
Ready mixed concrete (35 N/mm^2)	m^3	13,500
Ready mixed concrete (40 N/mm^2)	m^3	14,100
Steel		
Mild steel reinforcement	tonne	120,000
High tensile steel reinforcement	tonne	123,000
Bricks and blocks		
Common bricks (215 × 102.5 × 65 mm) – hand cut	1,000	9,500
Good quality facing bricks (215 × 102.5 × 65 mm)	1,000	22,300
Hollow cement blocks (400 × 200 × 100 mm)	1,000	52,000
Rubble (150–225 mm)	m^3	1,350

Continued

	Unit	*Cost LKR*
Timber and insulation		
Formwork timber class III (3/4″ thick)	m^2	462
Timber class I (25 × 100 mm)	m	487
Plywood sheets (8′ ×4′) – imported (15 mm thick)	each	2,900
Plywood doors (2′9″ × 6′9″)	each	11,000
Glass and ceramics		
Plain glass (3 mm)	m^2	600
Good quality ceramic wall tiles (108 × 108 mm)	m^2	1,650
Plaster and paint		
Lime plaster in 25 kg bags	tonne	14,500
Emulsion paint in 4 litre bucket	litre	690
Gloss enamel paint in 4 litre bucket	litre	850
Coloured pigment (red)	kg	875
Tiles and paviors		
Ceramic floor tiles (300 × 300 mm) – white	m^2	1,700
In situ terrazzo	m^2	5,000
Granite tiles (300 × 300 mm)	m^2	15,000
Drainage		
Sanitary ware – imported	3pcs	150,000
110 mm diameter PVC pipes – type 600	m	1,400
Roof covering		
Calicut roof tiles	1,000	46,000
Corrugated asbestos cement sheet	m^2	585
Precast items		
Bent-type fence posts intermediate 7′7″ + 1′6″(5″ × 5″) – (3″ × 3″)	nos	1,500
Concrete slabs 2′0″ × 2′0″ × 3″	nos	580
Kerbs concrete grade 20 150 × 300 915 type A	nos	600
Pre-stressed up rights – height 1050 mm	nos	1,200
Pre-stresses hand rails 2000 mm long 100 mm diameter	nos	1,600

Unit rates

The descriptions that follow are generally shortened versions of standard descriptions listed in Chapter 19. Where an item has a two-digit reference number (e.g. 05 or 33), this relates to the full descriptions against that number in Chapter 19. Where an item has an alphabetic suffix (e.g. 12A or 34B), this indicates that the standard description has been modified. Where a

modification is a major one, the complete modified description is included here and the standard description should be ignored, where a modification is minor (e.g. the insertion of a named hardwood), the shortened description has been modified here but, in general, the full description in Chapter 19 prevails.

The unit rates that follow are for main work items on a typical construction project in Colombo in the fourth quarter of 2013. The rates include all necessary labour, materials and equipment. Allowances to cover preliminary and general items and contractor's overheads and profit have been included in the rates. All the rates in this section exclude VAT.

		Unit	*Rate LKR*
Excavation			
01A	Mechanical excavation of foundation trenches (not exceeding 1 m depth)	m^3	745
02	Hardcore filling making up levels	m^3	2,450
Concrete work			
04A	Plain *insitu* concrete in strip foundation in trenches (15 N/m^2)	m^3	15,800
05	Reinforced *insitu* concrete in beds (20 N/m^2)	m^3	16,300
06	Reinforced *insitu* concrete in walls (20 N/m^2)	m^3	16,600
07A	Reinforced *insitu* concrete suspended floors or roof slabs (25 N/m^2)	m^3	18,000
08A	Reinforced *insitu* concrete in columns (30 N/m^2)	m^3	19,300
09A	Reinforced *insitu* concrete in isolated beams (30 N/m^2)	m^3	19,300
Formwork			
11A	Plywood formwork to concrete walls	m^2	1,800
12A	Plywood or metal formwork to concrete columns	m^2	1,750
13A	Plywood or metal formwork to horizontal soffits of slabs	m^2	1,600
Reinforcement			
14A	Reinforcement in concrete walls (10 mm)	tonne	185,000
15A	Reinforcement in suspended concrete slabs (10 mm)	tonne	182,000
16A	Fabric reinforcement in concrete (A142 steel mesh)	m^2	1,125
Brickwork and block work			
20	Precast lightweight aggregate hollow concrete block walls (100 mm thick)	m^2	2,100
21A	Brickwork in common bricks bedded in 1:5 cement sand mortar (1 brick thick)	m^2	3,850
21B	Brickwork in common bricks bedded in 1:5 cement sand mortar (1/2 brick thick)	m^2	2,250
23A	Facing bricks bedded in 1:5 cement sand mortar (1 brick thick)	m^2	5,600

Continued

		Unit	*Rate LKR*
Roofing			
24A	Calicut roof tiles 400 × 250 mm	m^2	900
25A	Plain clay roof tiles 200 × 150 mm	m^2	1,600
26A	Half round roof tiles	m^2	1,900
27A	Lunumidella roof boarding	m^2	1,850
31A	Double-sided reflective aluminium foil with wool blanket for thermostatic insulation (including sound insulation)	m^2	1,125
33A	Zinc/aluminium steel roof sheeting	m^2	3,100
Woodwork and metalwork			
34A	Preservative-treated sawn timber 75 × 100 mm	m	1,150
35	Preservative-treated sawn softwood 50 × 150 mm	m	1,550
36A	Single glazed casement window in class I timber size 630 × 900 mm	m^2	16,500
38A	Solid core half hour fire-resisting hardwood internal flush door, size 838 × 1981 mm	m^2	21,600
39A	Aluminium glazed window, size 1200 × 1200 mm	m^2	18,600
40A	Aluminium glazed door, size 850 × 2100 mm	m^2	21,450
41A	Timber skirtings (class I timber) 25 × 100 mm	m	975
Plumbing			
42A	UPVC half round eaves gutter (112 mm)	m	715
43A	UPVC rainwater pipes (110 mm)	m	985
45A	High-pressure plastic pipes for cold water supply (50 mm)	m	785
46A	Low-pressure plastic pipes for cold water distribution	m	450
47A	UPVC soil and vent pipes (110 mm/type 600)	m	2,560
48	White vitreous China WC suite	each	10,500
49	White vitreous China lavatory basin	each	9,200
50	White glazed fireclay shower tray	each	9,000
51	Stainless steel single bowl sink and double drainer	each	13,500
Electrical work			
52	PVC insulated and PVC sheathed copper cable core	m	250
53	13 amp unswitched socket outlet	each	950
54A	Flush mounted 5 amp, one-way light switch	each	650
Finishings			
55A	Two coats cement-based plaster on brick walls (rough finish)	m^2	540
56	White glazed tiles on plaster walls	m^2	4,200
57A	Non-slip ceramic floor tiles	m^2	4,400

Continued

		Unit	*Rate LKR*
58A	Cement and sand screed to concrete floors (12 mm thick)	m^2	500
59A	PVC floor tiles on screed	m^2	3,650
Glazing			
61	Glazing to wood	m^2	2,300
Painting			
62	Emulsion on plaster walls	m^2	520
63	Oil paint on timber	m^2	610

Note: The Government upward adjustments of energy prices in 2012 and 2013. Prices of petroleum products were raised by 37%–51% in February 2012 and further adjustments were made in December 2012 and early 2013, resulting in an increase of prices for most of the construction materials.

Approximate estimating

The building costs per unit area that follow are averages incurred by building clients for typical buildings in Sri Lanka as at the fourth quarter of 2013. They are based upon the total floor area of all storeys, measured between external walls and without deduction for internal walls.

Approximate estimating costs generally include mechanical and electrical installations but exclude furniture, loose or special equipment and external works; they also exclude fees for professional services. The costs shown are for specifications and standards appropriate to Sri Lanka and this should be borne in mind when attempting comparisons with similarly described building types in other countries. A discussion on this issue is included in Chapter 2. Comparative data for countries covered in this publication, including construction cost data are presented in Part III.

Approximate estimating costs must be treated with caution; they cannot provide more than a rough guide to the probable cost of building. All the rates in this section exclude VAT.

	Cost m^2 LKR	*Cost ft^2 LKR*
Industrial buildings		
Factories for owner occupation (light industrial use)	35,500	3,300
Factories for owner occupation (heavy industrial use)	82,000	7,624
Factory/office (high tech) for owner occupation (controlled environment, fully finished)	76,500	7,112
Warehouse, low bay for owner occupation	56,500	5,253
Warehouse, high bay for owner occupation	44,000	4,091

Continued

	Cost m² LKR	*Cost ft² LKR*
Administrative and commercial buildings		
Civic offices, non-air-conditioned	66,500	6,183
Civic offices, fully air-conditioned	73,500	6,833
Offices for letting/owner occupation high rise, air-conditioned 10–15 storeys	112,000	10,413
Headquarters office, 5–10 storeys, air-conditioned	138,000	12,830
Prestige office, high rise with air-conditioning and parking (intelligent buildings)	185,000	17,200
Health and education buildings		
General hospitals	66,500	5,223
Private hospitals	120,000	11,157
Health centres	73,000	6,795
Nursery schools	38,500	3,579
University buildings	50,800	4,722
Management training centres	46,400	4,300
Recreation and arts buildings		
Concert halls including seating and stage equipment	30,900	2,872
Swimming pools (international standard) including changing and social facilities (surface tension)	33,356	3,100
Swimming pools (school standard) including changing facilities	–	–
Local museums	38,400	3,570
City centre/shopping complex including parking	132,500	12,319
Book shops/libraries	46,500	4,323
Town development/shopping/bus stands	39,500	3,672
Studio/engineering buildings for television network	65,500	6,090
Shopping arcades	47,000	4,368
Stadium	32,000	2,975
Residential buildings		
Social/economic single family housing (single units)	37,500	3,486
Private/private single family housing 2-storey detached	44,500	4,137
Purpose designed single family housing 2-storey detached (single unit)	52,500	4,881
Local/economic apartment housing, low rise (no lifts) – low cost	49,500	4,602
Social/economics apartment housing, low rise (with lifts)	65,000	6,042
Private sector apartment building (standard specification)	82,500	7,668
Private sector apartment building (luxury)	135,000	12,551
Students/nurses hall of residences low cost	42,000	3,903

Continued

	Cost m² LKR	*Cost ft² LKR*
Hotel, 5 star, city centre	196,000	18,222
Hotel, 3 star, city	165,000	15,340
Resorts	78,548	7,300
Resorts – cottage type	88,000	8,181
Motel	69,000	6,415

Construction cost index

The table below presents construction cost index in Sri Lanka since 2005.

Year	*2005*	*2006*	*2007*	*2008*	*2009*	*2010*	*2011*	*2012*	*2013*
Construction cost index (1990 = 100)	299.8	343.6	387.7	437.3	456.2	465.9	490.9	550.8	590.4
Change (%)	–	14.6	12.8	12.8	4.3	2.1	5.4	12.2	7.2

Source: ICTAD Sri Lanka.

EXCHANGE RATES

Greater flexibility has been allowed in exchange rate since 2011, by limiting Central Bank's intervention in domestic foreign exchange market. This

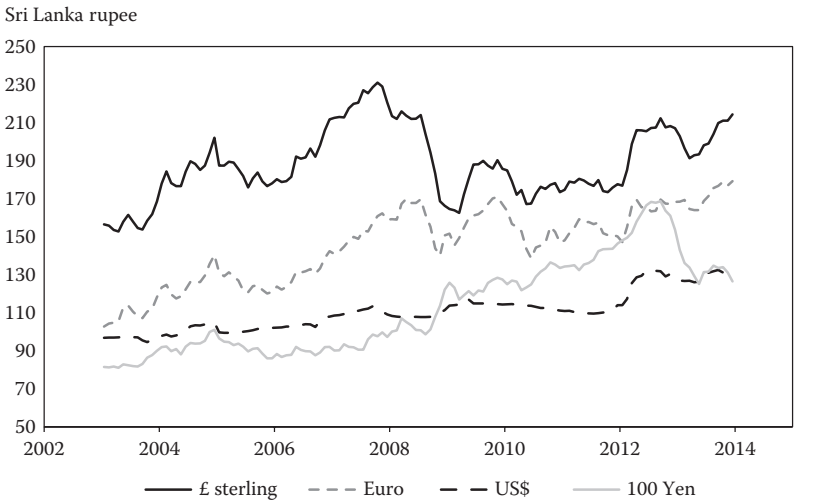


Figure 15.1 The Sri Lanka rupee against sterling, euro, US dollar and 100 Japanese yen.

move by the Government considerably affects the construction industry and the entire economy of the country. The rupee depreciated vis-à-vis the USD 11.6% during 2012.

Figure 15.1 above plots the movement of the Sri Lanka rupee against the sterling, the euro, the US dollar and 100 Japanese yen since 2003. The values used in the figure are quarterly and the method of calculating these is described and general guidance on the interpretation of the figure are provided in Chapter 2. The average exchange rate in the fourth quarter of 2013 was LKR 212.13 to pound sterling, LKR 178.30 to euro, LKR 131.00 to US dollar and LKR 130.53 to 100 Japanese yen.

USEFUL ADDRESSES

Public organisations

Board of Investment of Sri Lanka
Level 26, West Tower
World Trade Centre
Echelon Square
Colombo 01
Tel: (94) 112 385972-6/2346131-3/2434403-5/2435027/2447531
Fax: (94) 112 447994
E-mail: info@boi.lk
Website: www.investsrilanka.com

Building Economics and Management Research Unit (BEMRU)
Department of Building Economics
Faculty of Architecture
University of Moratuwa
Tel: (94) 112 650738/112 650301 – Ext 7200
Fax: (94) 112 650738
E-mail: info@becon.mrt.ac.lk
Website: www.becib.mrt.ac.lk

The Central Bank of Sri Lanka
P.O. Box 590
30, Janadhipathi Mawatha
Colombo 01
Tel: (94) 112 477000/112 440330/112 330220
E-mail: cbslgen@cbls.lk
Website: www.cbsl.gov.lk

Department of Buildings
2nd Floor

Sethsiripaya
Sri Jawardenapura
Battaramulla
Tel: (94) 112 862917/112 862921/112 862922/112 889456
E-mail: info@buildingsdept.gov.lk
Website: www.buildings.gov.lk

Department of Census and Statistics
4th and 5th Floors
Rotunda Tower
109 Galle Road
Colombo 03
Tel: (94) 112 147000/112 147050
E-mail: information@statistics.gov.lk
Website: www.statistics.gov.lk

Institute for Construction Training and Development (ICTAD)
Savsiripaya
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Colombo 07
Tel: (94) 112 699801
Fax: (94) 112 699738
E-mail: ictad@sltnet.lk
Website: www.ictad.lk

National Housing Development Authority (NHDA)
Sir Chittampalam A. Gardiner Mawatha
P.O. Box 1826, Colombo 02
Tel: (94) 112 431932/112 431707/112 431722/112 421748
Fax: (94) 112 449622
E-mail: info@nhda.lk
Website: www.nhda.lk

Road Development Authority
Head Office
1st Floor Sethsiripaya
Battaramulla
Tel: (94) 112 862767 (Acting Chairman)
Fax: (94) 112 864801
E-mail: cho@rda.gov.lk
Website: www.rda.gov.lk

Sri Lanka Standards Institution
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Colombo 08
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Website: www.slsi.lk

The Urban Development Authority
7th Floor, Sethsiripaya
Battaramulla
Tel: (94) 112 875916 to 920/112 873644/112 873647/112 873651/
112 873652/112 875333/112 863103
Fax: (94) 112 873637
E-mail: info@uda.lk
Website: www.uda.lk

Trade and Professional Associations

Chamber of Construction Industry Sri Lanka
129/6A Nawala Road
Colombo 05
Tel: (94) 112 368314/112 369544/113 050810
Fax (94) 112 368314
E-mail: ccisl@sltnet.lk
Website: www.ccisrilanka.org

Institute of Project Managers of Sri Lanka
189/1B, Nawala Road
Nugegoda
Tel: (94) 112 815391-2/114 406893
Fax: (94) 112 815390
E-mail: rsvpgsm@yahoo.com/lanmds@slt.lk
Website: www.ipmsl.org

Institute of Quantity Surveyors (IQS)
The Professional Centre, No. 275/75, 2nd Floor
275/5, Prof. Stanley Wijesundara Mawatha
Colombo 07
Tel (94) 112 595570/774 441221
E-mail: iqssl@sltnet.lk
Website: www.iqssl.lk

National Building Research Organisation (NBRO)
99/1 Jawatta Road

Colombo 05
Tel: (94) 112 588946
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E-mail: info@nbro.gov.lk
Website: www.nbro.gov.lk

National Construction Association of Sri Lanka (NCASL)
No. 350 A, Pannipitiya Road
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Tel: (94) 114 422222
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Website: www.ncasl.lk

Organisation of Professional Association Sri Lanka (OPA)
275/75, Prof. Stanley Wijesundera Mawatha
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Tel: (94) 112 580268/112 501721
Fax: (94) 112 559770
E-mail: opasrilanka.gmail.com/info@opasrilanka.org
Website: www.opasrilanka.org

Sri Lanka Institute of Architects (SLIA)
120/7, Vidya Mawatha
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E-mail: slialib1@sltnet.lk
Website: www.slia.lk

The Institution of Engineers Sri Lanka
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Fax: (94) 112 699202
Website: www.iesl.lk

Chapter 16

Taiwan

All data relate to 2013 unless otherwise indicated.

Population	
Population	23.37 mn
Urban population	64.5%
Population under 15	14.4%
Population 65 and over	11.5%
Average annual growth rate (2009–2013)	2.85%
Geography	
Land area	36,192 km^2
Agricultural area	22.3%
Capital city	Taipei
Population of capital city	2.69 mn
Economy	
Monetary unit	New Taiwan dollar (NT$)
Exchange rate (average fourth quarter of 2013) to:	
The pound sterling	NT$47.80
The US dollar	NT$29.54
The euro	NT$40.19
The yen × 100	NT$29.43
Average annual inflation (2009–2013)	0.86%
Inflation rate	0.8%
Gross domestic product (GDP) (2013 forecast)	NT$14,480 bn
GDP per capital	NT$620,274
Average annual real change in GDP (2009–2013 forecast)	3.27%
Private consumption as a proportion of GDP (2012)	60.1%
Public consumption as a proportion of GDP (2012)	12.4%
Investment as a proportion of GDP (2012)	19.9%

Continued

Construction	
Gross value of construction output (2012)	NT$399.7 bn
Net value of construction output (2012)	NT$377.7 bn
Net value of construction output as a proportion of GDP (2012)	2.7%

THE CONSTRUCTION INDUSTRY

Construction output

The gross output of construction in 2012 was NT$399.7 billion, equivalent to US$13.2 billion or 2.8% of GDP. The net output of construction in 2012 was approximately NT$377.7 billion, equivalent to US$12.2 billion or 2.7% of GDP.

The output of construction for the years 2009–2012 is illustrated in Table 16.1.

The output in 2009 posed a declination which was an afterward effect of the Financial Tsunami caused by subprime mortgage market in the United States in 2007 and 2008. The market soon recovered in 2010 and continued to grow in the coming years. In general, the construction industry especially in the residential market enjoys a booming season from 2011 to 2013 partly due to Quantitative Easing policy by US government. Starting from early 2013, the government was trying to curb the seemingly overheated housing market; however, the result was minimal. The price of a house remains at its high.

The government since elected in 2008 has committed to launch a series of major projects trying to re-boost the momentum of the economy as well as upgrade the infrastructure for the island to realise the election campaign promises. The total estimated investment in two terms (8 years) of the government amounts to NT$4 trillion. Among the said investment, 70% is the

Table 16.1 Output of construction, 2009–2012 (Mn NT$)

	NT$	*Real growth rate (%)*
2009	333,724	−1.39
2010	383,943	2.88
2011	403,322	2.83
2012	399,683	1.45

Base: 2006 = 100.

Source: Directorate-General of Budget, Accounting and Statistics.

government investment and 30% is private investment. Up to the second quarter of 2013, the rate of achievement is close to 60%. Until early 2016, the said balance investment will still be used in public works.

Characteristics and structure of the industry

It is a legal requirement in Taiwan for construction firms to be registered under a government administered licensing system. There are five types of licences: Class A, B, C, specialist contractor and small contractor. The licences are awarded according to a company's capital, technical ability and experience. The highest category, Class A, enables the contractor to tender for projects of a reasonable size. Class B enables the contractor to work on projects up to a value of NT$75 million, Class C on projects up to a value of NT$22.5 million and 10 times of its capital for specialist contractor and NT$6 million for small contractor.

A contractor's licence can be upgraded after a set period of time and subject to satisfactory performance at the class in which it is currently operating. Licences can also be transferred whereby a contractor may purchase a Class A licence from another company which no longer has the technical expertise to handle large projects.

In the past, the licensing system has served to exclude foreign contractors from entering the marketplace. However, based on the newly revised contractor law, foreign contractors can apply for contractor licence as long as the applicant meets the entire requirement set forth under the said law. As of end of 2013, there were 5,244 contractors under Class A; 3,037 under Class B; 15,796 under Class C; 806 under specialist contractor; and 16,356 under small contractor.

Typically, the local construction companies are small family-run businesses, short on expertise and modern technology. Commitment to research and development is limited with new technologies being obtained by means of technology transfer from foreign joint venture partners or simply purchased as necessary. The largest local construction company is Ret-Ser Engineering Agency (RSEA), a previously quasi-government organisation which had, prior to April 1997, received preferential consideration when tendering for public works. Amid allegations of corruption and in line with a general restructuring of government procurement practices aimed at minimising inefficiencies, these special privileges were withdrawn. The company has been privatised and changed its name to RSEA Engineering Corporation in 1998. In the past two decades, Japanese major construction companies played a big role in Taiwan construction industry. These companies along with some local major construction companies share the high-end market of residential building projects in Taiwan.

When applying for admission into the World Trade Organisation (WTO), Taiwan was strongly requested by most of the members that an Agreement on Government Procurement be signed. It was therefore for the government to conduct fundamental reforms to its government procurement systems and review and revise all relevant laws and codes in order to meet the spirit of international collaboration. Normally, for projects in excess of NT$50 million, the procurement will be administered by the Public Construction Commission (PCC) who are authorised to solicit foreign tenders. Tenders are announced through the *Government Procurement Gazette* and the *Government Procurement Information System (GPIS)* bulletin board, accessed on the Internet through gpis.pcc.gov.tw. The tendering and procurement process is monitored by the Ministry of Audit (MOA) to ensure transparency, non-discrimination, efficiency and accountability. A complaint and appeal procedure has also been established to investigate and rule on any complaints received on the tendering process. The tenderer also has the right to file an action in a court against the procuring entity for any breach of a contract awarded.

Whilst Taiwan recorded an unemployment rate of 4.16% in 2013 due to the global financial crisis, the unemployment rate has been on the downward trend. In 2013, the construction industry employed an average of 860,000 people, of which approximately 2,800 (or 0.33%) were foreigners.

Clients and finance

To provide a boost for the sector, the government has accelerated programmes for infrastructure and public works projects and reviewed the legal codes governing the industry. However, faced with the difficulty of balancing the budget and looking to achieve effective management and cost control on public works projects, the government needs more participation from the private sector.

The housing market is the single largest sector of the construction industry. Up to 2013, approval was given for the commencement of 39,760,495 m^2 of building projects. Funding comes from both private and public sectors. The government also offers a low-interest loan scheme to assist low-income families in meeting their housing needs.

It is anticipated that foreign investment especially for those capital from mainland China in the construction market will increase as a result of both the BOT projects and the relaxation of foreign investment restrictions (Table 16.2). Overall, it is however expected that domestic investment and demand will continue to dominate for the foreseeable future.

Table 16.2 Approved foreign investment in construction projects

Year	*Amount US$ (Thousand)*
2009	24,429
2010	35,787
2011	64,761
2012	46,012
2013 (January 2013–November 2013)	26,769

Source: Investment Commission Ministry of Economic Affairs Republic of China (November 2013).

Selection of design consultants

In the case of architects, the normal basis of selection will be on their experience. Personal contacts and recommendations also play a part. The profession of architect in Taiwan is split into two categories: Class A and Class B. These classes are used as a basis for establishing their suitability for different types of work. As of 2012, there are 3,618 Class A architects and 25 Class B architects.

As with the architects, the structural engineer will normally be selected according to track record and general suitability for the project in question.

The title of quantity surveyor or cost consultant is not formally recognised in Taiwan. The preparation of estimates, tender documents, interim payments and advising on contractual matters all fall within the architect's purview or be part of the professional construction management service.

Contractual arrangements

The procedures of the tendering of public sector works are regulated in the Government Procurement Law and is briefly described as follows (assuming a procurement authority is acting on end-user's behalf in carrying out the tender process):

1. *Preparation of invitation documentation*
   Upon receipt of procurement authorisation from a government agency or enterprise (the end-user), procurement authority will first review the end-user's specifications with special terms and conditions to ensure the suitability for a tender from the points of view of government regulations and international commercial practice.

2. *Public notice of an invitation to tender*
   For open tendering procedures or selective tendering procedures, procurement authority will publish a notice of invitation to tender or of qualification evaluation on the *Government Procurement Gazette*. The time limit for submission of tenders from the date of publishing a notice to receiving documents varies with the value and contents of the procurement.
3. *Submission of tenders*
   All prospective tenders are required to use the standard invitation, tender and contract form that are available at the procurement authority office. The tender shall be submitted to procurement authority before the deadline for tendering. Any tender that is received at the procurement authority after the deadline will not be considered unless a tender from an overseas company is airmailed to the procurement authority before the tendering deadline and it is stated in the company's fax, reaching procurement authority prior to the tendering deadline.
4. *Requirement for a bid bond*
   Unless otherwise specified, a bid bond is required. The bid bond shall be deposited by cash, bank's promissory note, bank's check, certified check, bearer's government bond of ROC, a certificate of deposit pledged to the procuring entity, irrevocable stand-by letter of credit issued or confirmed by a bank or bank guarantee or insurance policy under which the bank or insurer shares the liability with the tenderer jointly and severally.

   Bid bonds provided by unsuccessful tenderers will be returned without interest after announcement of the award of a contract or contracts.
5. *Tender opening and tender evaluation*
   The end-user shall set a government estimate before the opening of the tenders. Procurement authority official will publicly open all the tenders received and read out the essential points of each tender, such as names of the tenderer and the manufacturer, source of supply, price and shipment date and so on. Tenderers and their suppliers or manufacturers are always welcome to attend the opening of tenders. Thereafter, the end user will be responsible for the evaluation of specifications contained in the tenders. Tenders of simple contents may be evaluated on the spot and then a contract will be awarded to the winning tenderer. Sometimes clarification is sought to ensure the acceptability of the tenders before any decision is made. Procurement authority will record all the opening processes of each tender and provide the end-user and supervision personnel with a copy of the record.

6. *Award of a contract*
   The award of a contract will, in principle, be made to the tenderer whose tender meets the requirements set forth in the tender documentation and is the lowest tenderer within the government estimate. That is to say, the lowest acceptable tenderer may not win the award if his price exceeds the government estimate, but he will usually have a chance to reduce his price to the extent equal to or lower than the government estimate.
7. *Signing of a contract*
   After the award is made, a Notice of Award will be issued to the winning tenderer and a contract is signed.

   Generally, public contracts will be let under a government standard form of contract. In cases where international bids are being invited, *FIDIC* (an international form of contract), the *UK Joint Contracts Tribunal* (JCT) or the *American Institute of Architects Form of Contract* may be used.
8. *Requirement for a performance bond*
   Usually, the contractor is required to provide a performance bond within certain days after the date of Notice of Award.

   The performance bond shall also be posted in one of the forms enumerated for the bid bond except that the validity and contents of the stand-by L/C are somewhat modified to meet the requirements of contract.

Tender for Private Project

In the private sector, the market is very commercial. The employer or client will himself take responsibility for the issue of the tender. He will also conduct any subsequent negotiations. By international standards/practices, such tendering process could be viewed as relatively unsophisticated with little emphasis on tendering procedures and fair play.

Liability and insurance

Most contracts for public works are let under the government standard forms of contract. These forms set out the risks, rights and obligations of the various parties to the contract. Generally, the contracts place a significant amount of the risk on the contractor.

For government projects, disputes are referred to the Public Construction Procurement Appeal Review Committee. The decree of the said committee was first published by PCC in April 1999 and the latest revision was made in April 2008. The committee was separated into two levels, that is, central government level and local government level who deal with these disputes

that arise in central and local government procurement, respectively. The roles of the Procurement Appeal Committee are as follows:

- To settle disputes relating to tender invitation procedures for any public construction project
- To settle contract disputes relating to public construction
- To settle disputes of any other nature relating to public construction projects

The period for which a contractor remains liable under a contract varies and must be written into the contract. In addition, under the standard form of contract, the contractor is responsible for providing insurances covering the works themselves, workmen engaged on the works and third-party liability. It is also common for the contract to call for a performance bond (bank bond), often involving a substantial sum of money.

Development control and standards

The Construction and Planning Agency (CPA) was established in March 1981 and is the governmental department in charge of regional planning, city planning and building regulations among others. The following departments fall under its auspices.

The Department of Regional Planning is responsible for the overall planning of national land use. This will include development and ratification of regional plans, supervision, promotion and coordination of affairs related to regional development. On a more local level, the Department of City Planning is responsible for urban development policies. City planning laws, new towns planning, urban renewal and coordination of metropolitan development also fall under their jurisdiction. All planning applications and licences for construction are processed through this department.

Land usage in Taiwan is strictly regulated under the urban planning, area planning and construction laws. The purpose for which a site may be used is defined in terms of zones. Rezoning is possible but can be difficult, protracted and ultimately dependent upon government discretion. The Statute for Upgrading Industry (SUI) also sets forth important provisions specifying land use and land rights.

In common with most developed countries, there are increasing concerns over the environment and the environmental impact caused by any construction project. As people become more affluent, they are demanding a higher quality of life and are less willing to sacrifice their environment for apparent economic progress. Thus there was a need for comprehensive environmental legislation and enforcement. Towards that end, in 1987, Taiwan's Environmental Protection Agency (EPA) was formed. The primary function of the EPA is to articulate and develop environmental

policy and draft regulations implementing existing legislation. The task of enforcing environmental laws and regulations has been delegated to the Environmental Protection Bureau.

The Construction and Planning Administration also regulates the industry. This regulation includes approval of applications to establish new construction companies and new subcontracting firms and approval of advancement of construction companies to higher classifications.

CONSTRUCTION COST DATA

Cost of labour

The figures that follow are typical of labour costs in the Taipei area as at the fourth quarter of 2013. The wage rate is the basis of an employee's income, while the cost of labour indicates the cost to a contractor of employing that employee. The difference between the two covers a variety of mandatory and voluntary contributions – a list of items which could be included is given in Chapter 2.

	Wage rate (per day) NT$	*Cost of labour (per day) NT$*	*Number of hours worked per year*
Site operatives			
Bricklayer	2,700	3,100	2,200
Carpenter	2,750	3,150	2,200
Plumber	2,550	2,950	2,200
Electrician	2,550	2,950	2,200
Structural steel erector	2,750	3,150	2,200
Semi-skilled worker	2,400	2,750	2,200
Unskilled labourer	1,850	2,150	2,200
Steel bender	2,750	3,150	2,200
Scaffolder	2,750	3,150	2,200
Plasterer	2,750	3,150	2,200
Site supervision	*(per month)*	*(per month)*	
General foreman	70,000	91,000	2,200
Trades foreman	64,000	83,200	2,200
Clerk of works	74,000	96,000	2,200
Contractors' personnel			
Site manager	75,000	97,500	2,200
Resident engineer	55,000	71,500	2,200

Continued

	Wage rate (per month) NT$	*Cost of labour (per month) NT$*	*Number of hours worked per year*
Junior engineer	38,000	49,400	2,200
Planner	55,000	71,500	2,200
Consultants' personnel			
Senior architect	180,000	234,000	2,080
Senior engineer	130,000	169,000	2,080
Qualified architect	110,000	143,000	2,080
Qualified engineer	90,000	117,000	2,080

Cost of materials

The figures that follow are the costs of main construction materials, delivered to site in the Taipei area, as incurred by contractors in the fourth quarter of 2013. These assume that the materials would be in quantities as required for a medium-sized construction project and that the location of the works would be neither constrained nor remote.

All the costs in this section exclude value added tax (VAT).

	Unit	*Cost NT$*
Cement and aggregate		
Ordinary Portland cement in 50 kg bag	bag	175
Coarse aggregates for concrete	m^3	700
Fine aggregates for concrete	m^3	850
Ready mixed concrete (4000 psi)	m^3	2,800
Ready mixed concrete (2000 psi)	m^3	2,200
Steel		
Reinforcement ($fy \geq 4200$ kg/cm^2)	tonne	21,500
Reinforcement ($fy \geq 2800$ kg/cm^2)	tonne	19,500
H section (<700 mm)	kg	28
H section (>700 mm)	kg	29
Channel	kg	22
Angle	kg	22
Bricks and blocks		
Common bricks (210 × 100 × 50 mm)	1,000	2,400
Good-quality facing bricks (210 × 100 × 50 mm)	1,000	4,000
Hollow concrete blocks (390 × 190 × 190 mm)	1,000	4,700

Continued

	Unit	*Cost NT$*
Timber and insulation		
Exterior quality plywood (12 mm)	m^2	250
Plywood for interior quality (12 mm)	m^2	300
4 mm thick quilt insulation	m^2	450
100 mm thick rigid slab insulation	m^2	280
Hardwood internal door complete with frame and ironmongery	each	12,000
Glass and ceramics		
Semi-reflective glass (6 mm)	m^2	850
Plaster and paint		
Good quality ceramic wall tiles (200 × 300 mm)	m^2	750
Plasterboard (12 mm thick)	m^2	150
Emulsion paint	litre	300
Tiles and paviors		
Clay floor tiles (250 × 250 × 9 mm)	m^2	450
Vinyl floor tiles (300 × 300 × 2.3 mm)	m^2	450
Precast paving slabs (250 × 250 × 25 mm)	m^2	650
Drainage		
WC suite complete	each	20,000
Lavatory basin complete	each	8,000
150 mm cast iron drain pipes	m	700

Unit rates

The descriptions that follow are generally shortened versions of standard descriptions listed in full in Chapter 19. Where an item has a two-digit reference number (e.g. 05 or 33), this relates to the full description against that number in Chapter 19. Where an item has an alphabetic suffix (e.g. 12A or 34B), this indicates that the standard description has been modified. Where a modification is major, the complete modified description is included here and the standard description should be ignored; where a modification is minor (e.g. the insertion of a named hardwood), the shortened description has been modified here but, in general, the full description in Chapter 19 prevails.

The unit rates that follow are for main work items on a typical construction project in Taipei in the fourth quarter of 2013. The rates include all necessary labour, materials and equipment. An allowance of 5%–10% to cover preliminary and general items has been added to the rates. All the rates in this section exclude VAT.

		Unit	*Rate NT$*
Excavation			
01	Mechanical excavation of foundation trenches including earthwork support	m^3	725
02	Hardcore filling in bed; 150 mm thick	m^2	300
Concrete work			
04A	Plain *in situ* concrete (2000 psi) in beds	m^3	2,300
05A	Reinforced *in situ* concrete (4000 psi) in beds	m^3	2,850
06A	Reinforced *in situ* concrete (4000 psi) in walls	m^3	2,850
07A	Reinforced *in situ* concrete (4000 psi) in suspended floors	m^3	2,850
08A	Reinforced *in situ* concrete (4000 psi) in columns	m^3	2,850
09A	Reinforced *in situ* concrete (4000 psi) in suspended beams	m^3	2,850
Formwork			
11	Formwork to sides of wall	m^2	900
12	Formwork to sides of columns	m^2	900
13	Formwork to soffit of suspended slabs	m^2	950
Reinforcement			
14	Reinforcement in concrete walls	kg	25
15	Reinforcement in suspended concrete slabs	kg	25
Steelwork			
17	Fabricate, supply and erect steel frame structure	tonne	50,000
Brickwork and blockwork			
22A	Solid (perforated) sand lime bricks (half-brick thick)	m^2	692
Roofing			
24A	300 × 300 × 20 mm thick concrete tiles	m^2	550
30A	Waterproof sheet membrane	m^2	660
30B	Waterproof cement and sand screed; average 90 mm thick	m^2	750
32A	Polyurethane spray foam roof insulation 6 mm thick	m^2	900
Woodwork and metalwork			
37A	Proprietary plastic laminated door; size 900 × 2100 mm (excluding ironmongery)	each	11,000
38A	1 h fire rated proprietary plastic laminated door; size 900 × 2100 mm (excluding ironmongery)	each	35,000
39A	Double glazed aluminium window; size 900 × 2100 mm	each	22,000

Continued

		Unit	*Rate NT$*
40A	Proprietary steel door; size 2000 × 1400 mm	each	45,000
41A	38 mm diameter stainless-steel tubular rails	m	3,200
41B	50 mm diameter stainless-steel tubular rails	m	3,500
Plumbing			
44A	50 mm diameter galvanised steel pipes; fixed to wall	m	350
44B	75 mm diameter galvanised steel pipes; fixed to wall	m	600
44C	100 mm diameter galvanised steel pipes; fixed to wall	m	800
47A	300 mm wide × 600 mm average depth surface channels	m	7,500
47B	Precast concrete channel covers	m	1,200
47C	600 × 400 × 30 mm thick cast iron gratings	no	2,100
Finishings			
55A	20 mm thick cement and sand plaster to wall	m^2	650
56A	200 × 200 × 5 mm white glazed tiles	m^2	1,500
56B	Metallic lustre ceramic facing tiles to external wall	m^2	2,500
56C	100 × 100 × 9 mm unglazed porcelain tiles	m^2	1,200
56D	Paperhanging; vinyl sheet covering to walls	m^2	700
58A	150 mm thick lightweight concrete to floors	m^2	375
58B	50 mm thick cement and sand paving; steel trowelled smooth	m^2	750
60A	Mineral fibreboard suspended ceiling system	m^2	800
60B	Aluminium suspended ceiling system	m^2	2,500
Glazing			
61A	6 mm thick clear float glass	m^2	1,200
61B	Reflective double glazing to metal	m^2	4,000
Painting			
62A	Emulsion paint with acrylic alkali resisting primer to ceilings	m^2	280
62B	Cement paint in two coats to plastered ceilings	m^2	150
62C	Spraying polyurethane paint to walls	m^2	270

Approximate estimating

The building costs per unit area that follow are averages incurred by building clients for typical buildings in the Taipei area as at the fourth quarter of 2013. They are based upon the total floor area of all storeys, measured between external walls and without deduction of internal walls.

Approximate estimating costs generally include mechanical and electrical installations but exclude furniture, loose or special equipment and

external works; they also exclude fees for professional services. The costs shown are for specifications and standards appropriate to Taiwan and this should be borne in mind when attempting comparisons with similarly described building types in other countries. A discussion of this issue is included in Chapter 2. Comparative data for countries covered in this publication, including construction cost data are presented in Part III.

Approximate estimating costs must be treated with caution; they cannot provide more than a rough guide to the probable cost of building.

	Cost m² NT$	*Cost ft² NT$*
Industrial buildings		
Factories for letting	25,700	2,388
Factories for owner occupation (light industrial use)	27,200	2,527
Factories for owner occupation (heavy industrial use)	33,300	3,094
Factory/office (high tech) for letting (shell and core only)	30,250	2,810
Warehouses, low bay for owner occupation	27,200	2,527
Administrative and commercial buildings		
Civic offices, fully air-conditioned	47,400	4,404
Offices for letting, 5–10 storeys, air-conditioned	36,300	3,372
Offices for letting, high rise, air-conditioned	40,800	3,790
Prestige/headquarters office, high rise, air-conditioned	54,450	5,059
Health and education buildings		
General hospitals (100 beds)	75,625	7,026
Health centres	60,500	5,621
Primary/junior schools	30,250	2,810
Secondary/middle schools	36,300	3,372
Recreation and arts buildings		
Theatres (>500 seats) including seating and stage equipment	56,332	5,233
City centre/central libraries	46,893	4,356
Residential buildings		
Social/economic apartment housing, low rise	25,700	2,388
Social/economic apartment housing, high rise (with lifts)	30,250	2,810
Private sector apartment building (standard specification)	36,300	3,372
Private sector apartment buildings (luxury)	45,400	4,218
Hotel, 5 star, city centre	65,800	6,113

Regional variations

The approximate estimating costs are based on projects in Taipei. For Kaohsiung and other areas, the costs should be reduced by approximately 6%.

Value-added tax

The standard rate of VAT is currently 5%, chargeable on general building work.

EXCHANGE RATES AND INFLATION

The combined effect of exchange rates and inflation on prices within a country and price comparisons between countries are discussed in Chapter 2.

Exchange rates

Figure 16.1 plots the movement of the New Taiwan dollar against the sterling, the euro, the US dollar and Japanese yen since 2003. The values used in the figure are quarterly and the method of calculating these is described and general guidance on the interpretation of the figure are provided in Chapter 2. The average exchange rate in the fourth quarter of 2013 was NT$47.80 to pound sterling, NT$40.19 to euro, NT$29.54 to US dollar and NT$29.43 to 100 Japanese yen.

Price inflation

Table 16.3 presents consumer price inflation in Taiwan since 2003.

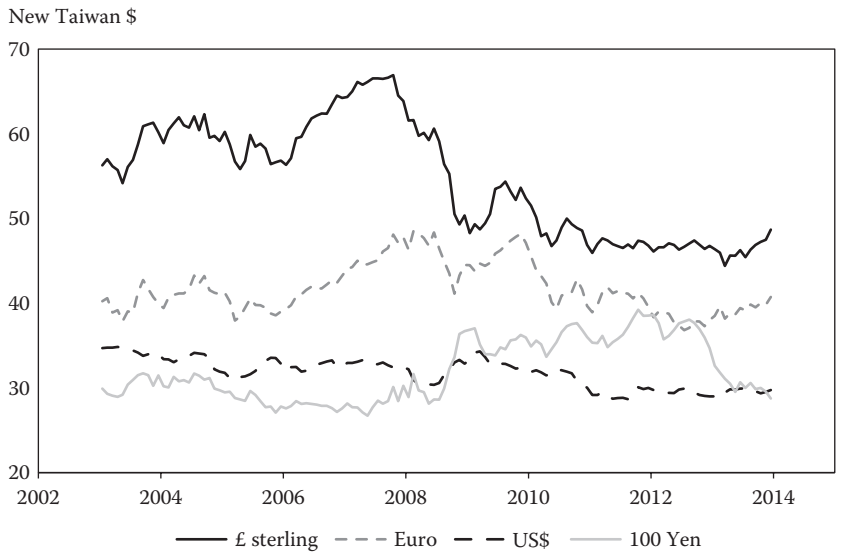

Figure 16.1 The New Taiwan dollar against sterling, euro, US dollar and 100 Japanese yen.

Table 16.3 Consumer price indices

	Consumer price index		*Construction cost index*	
Year	*Average index*	*Average change %*	*Average index*	*Average change %*
2003	89.39	–0.28	67.20	4.68
2004	90.83	1.62	76.69	14.12
2005	92.93	2.31	77.23	0.76
2006	93.48	0.62	82.82	7.27
2007	95.16	1.80	90.28	9.04
2008	98.52	3.54	102.90	14.07
2009	97.66	–0.86	93.79	–8.64
2010	98.60	0.97	96.78	3.20
2011	100.00	1.43	100.00	3.34
2012	101.94	1.93	100.84	0.84
2013	102.74	0.80	100.49	–0.34

Base: 2011 = 100.

Source: Commodity – price statistics monthly in the Taiwan Area of the Republic of China by the Directorate-General of Budget, Accounting and Statistics and Central Bank of China Annual Report.

Construction costs rose from 2004 to 2008 mostly as a result of a strong residential market and the strong demand of construction material worldwide. Typically over the period from 2003 to 2013, labour costs have increased slightly whilst over the same period; especially from 2004 to 2007 material prices have rose significantly according to market demand. This trend remained unchanged in the early half year of 2008. However, due to the global financial crisis, construction costs began to decline from August 2008 and recovered during the period of 2009–2013.

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Chapter 17

Thailand

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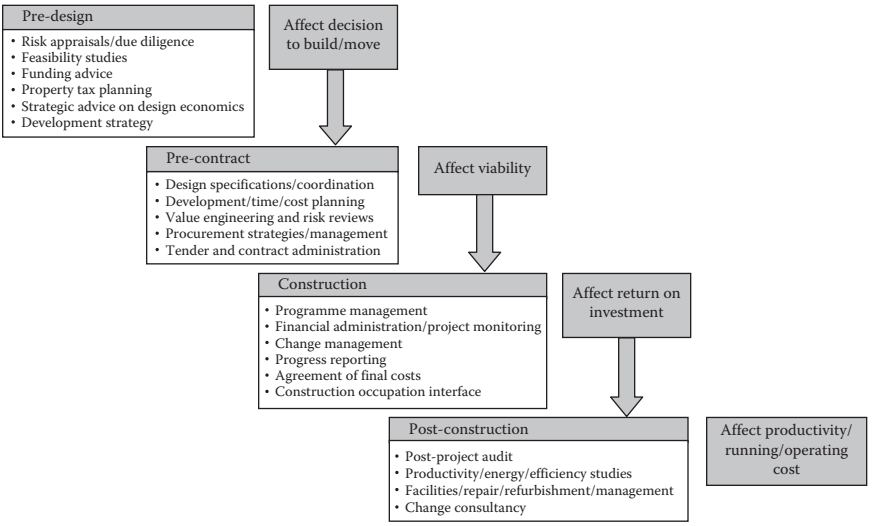

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All data relate to 2013 unless otherwise indicated.

Population	
Population	64.87 mn
Urban population	34%
Population under 15	18.4%
Population 65 and over	15.3%
Average annual growth rate (2003–2013)	0.5%
Geography	
Land area	514,000 km^2
Agricultural area	35%
Capital city	Bangkok
Population of capital city	10 mn
Economy	
Monetary unit	Thai Baht (Bt)
Exchange rate (average fourth quarter 2013) to:	
The pound sterling	Bt 51.57
The US dollar	Bt 31.76
The euro	Bt 43.37
The yen × 100	Bt 31.03
Average annual inflation (1998–2013)	2.8%
Inflation rate	2.2%
Gross domestic product (GDP)	Bt 11,897 bn
GDP per capita	Bt 183,402
Average annual real change in GDP (2001–2013)	4.1%
Private consumption as a proportion of GDP	54.3%
Public consumption as a proportion of GDP	13.81%
Investment as a proportion of GDP	29.9%
Construction	
Gross value of construction output	–
Net value of construction output (2011)	Bt 282 bn
Net value of construction output as a proportion of GDP	2.4%

Source: National Economic and Social Development Board; Bangkok Bank, Research Department; Institute for Population and Social Research, Mahidol University.

THE CONSTRUCTION INDUSTRY

Construction output

The net output of the construction industry in 2011 was Bt 282 billion, equivalent to US$8.88 billion, or 2.4% of GDP.

The graphs below show the value of land transfer, construction area permitted and the net output of the construction industry at current prices for the past 20 years (Figures 17.1 through 17.3).

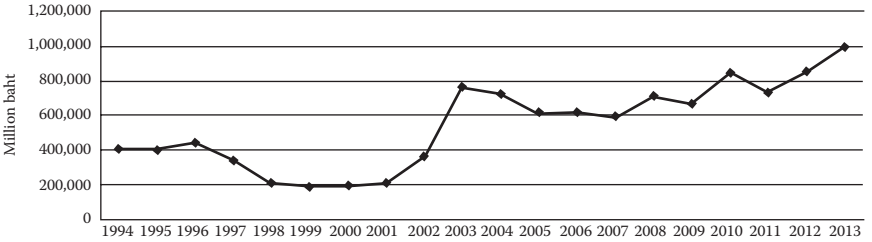

Figure 17.1 Land transaction. (From Bank of Thailand, Board of Investment.)

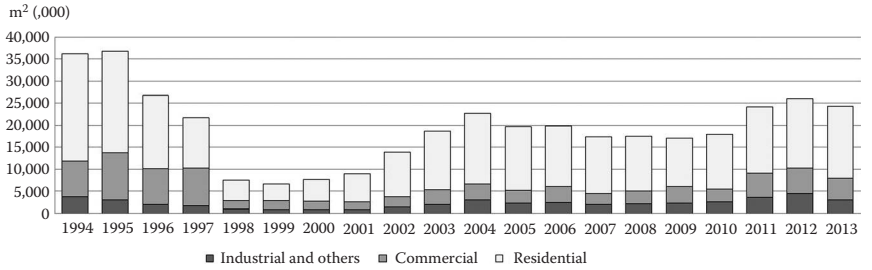

Figure 17.2 Construction area permitted in municipal zone. (From Bank of Thailand, Board of Investment.)

Since 2000, construction works in the construction industry have risen gradually. However, there were signs of slowing down in the last few years due to internal political problems. Towards the fourth quarter of 2013, the construction industry declined from previous quarters as both public and private construction contracted at all levels.

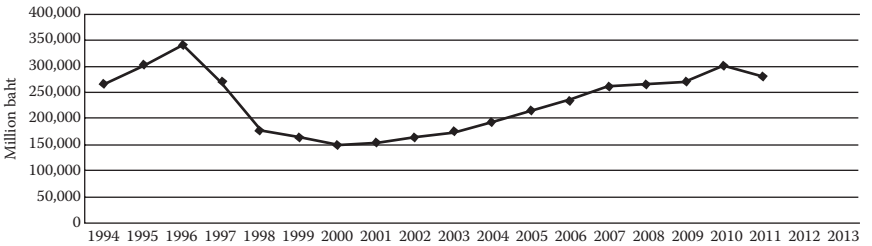

Figure 17.3 Construction output at current prices (GDP). (From Bank of Thailand, Board of Investment.)

Characteristics and structure of the industry

In the private sector, construction work in Thailand is generally undertaken by various specialist contractors such as piling contractors, main contractors (covering the structure and architectural work with some of them capable of doing mechanical and electrical work too), M&E contractors, aluminum window and curtain wall contractors, interior (ID) works contractors and other specialists contractors.

For large projects, most developers prefer to contract the works directly to specialist contractors under separate contracts instead of nominating sub-contractors under a main contractor. This is partly to avoid paying double taxation on withholding tax.

The main contractor (traditionally undertaking structure and architectural works) will provide attendance and coordinate all other direct contractors on site.

Construction firms are required to be registered to operate business in Thailand. However, there are no specific requirements to obtain a licence to operate as a contractor. For some Government projects, only contractors registered with the Council of Contractor are qualified to tender.

Traditionally, architects provide design services only and do not undertake supervision or management functions on the project. The management and supervision of the works are normally undertaken either by the client in-house or by a separately appointed project management firm.

Clients and finance

The private sector investment accounts for 40% of the construction works and remaining 60% by the public sector.

Financing of construction works is typically done through loans from banks and financial institutions. In some cases, there are developers who finance their projects through their own funds. However, such funds usually represent a partial amount only and the remaining would be financed through financial institutions.

Selection of design consultants

For private sector work, the selection of consultants is normally based on their track record and fee level.

For public sector work, the consultants are normally appointed in a bidding process.

Contractual arrangements

Construction contract documents may be prepared either in Thai or English. Several versions of the standard Form of Contract prepared by

various departments are used on Government projects. For the private sector, no standard Form of Contract exists although a simplified version of the standard form published by the Joint Contracts Tribunal (JCT) in the UK and FIDIC are commonly adopted.

The traditional Lump Sum contract is still the most common method of contract procurement. Design-and-build, construction management and Build, Operate and Transfer (BOT) methods are also used occasionally for large-scale projects requiring extensive technical input.

Selection of contractors through competitive bidding is the norm although negotiation with pre-selected contractors and cost-plus arrangements (also negotiated with pre-selected contractors) are also adopted.

Development control and standards

Land titles

There are many types of land titles or certificates used as evidence of land ownership, possession rights and other interest in land but only land with Chanote, Nor Sor Sam Gor or Nor Sor Sam can be sold or applied for building approval.

Chanote – Chanote is the only true title deed. The person's name shown on the deed has the legal ownership to the land. The land is accurately surveyed and plotted with uniquely numbered marker posts set in the ground.

Nor Sor Sam Gor – Nor Sor Sam Gor certifies that the person named on the certificate has the right to possess the land and use the benefit of the land as an owner. The land is accurately surveyed and the issuance of the title deed is pending.

Nor Sor Sam – Similar to Nor Sor Sam Gor but not all of the formalities to certify the right to use have been performed. The land is not accurately surveyed and may be subject to boundary dispute.

Other forms of land titles or rights are Sor Kor Nung, Por Bor Tor 6 and Sor Por Kor 4-01. Land with these types of titles or certificates can neither be transferred nor obtained approval to build on.

Land in Thailand is measured in:

1 Rai = 4 Ngan (1,600 m^2)
1 Ngan = 100 Wah (400 m^2)
1 Wah = 4 m^2
1 Acre is approximately 2.529 Rai
1 Hectare is approximately 6.25 Rai

Generally, ownership of land by foreigners is highly restricted. The common option is to set up a majority of Thai owned limited companies. The other option is by leasing but the maximum land lease which can be registered with the land office is 30 years.

Zoning and building regulations

Construction in Thailand is mainly governed by the Town and City Planning Act and Building Control Act.

The Town and City Planning Act deals with permissible use of land in different zones including Floor Area Ratio (FAR). The zoning regulations also limit the height and size of the building, depending on the width of the frontage road. Each district may have separate zoning restrictions. For example, in Phuket Island, no construction of any type is allowed on land that is 80 m above the average sea level and within 20 m from the coastal line.

Annual building inspection

This regulation came into effect since 2007 requiring the owner of buildings of certain sizes and functions to appoint a registered inspector to inspect the building annually.

CONSTRUCTION COST DATA

Cost of labour

The figures that follow are typical of labour costs in the Bangkok area as at the fourth quarter of 2013.

	Wage rate (per day) Bt	*Number of hours worked per year*
Site operatives		
Bricklayer	550	2,496
Carpenter	550	2,496
Plumber	650	2,496
Electrician	750	2,496
Structural steel erector	500	2,496
HVAC installer	650	2,496
Semi-skilled worker	500	2,496
Unskilled labourer	350	2,496
Equipment operator	650	2,496
Watchman/security	350	2,496
Site supervision	*(per month)*	
General foreman	30,000	2,496
Trades foreman	25,000	2,496

Continued

	Wage rate (per month) Bt	*Number of hours worked per year*
Clerks of works	30,000	2,496
Resident engineer	40,000	2,496
Contractor's personnel		
Site manager	65,000	2,496
Resident engineer	45,000	2,496
Resident surveyor	45,000	2,496
Junior engineer	35,000	2,496
Junior surveyor	35,000	2,496
Consultants' personnel		
Senior architect	85,000	2,496
Senior engineer	75,000	2,496
Senior surveyor	65,000	2,496
Qualified architect	45,000	2,496
Qualified engineer	45,000	2,496
Qualified surveyor	45,000	2,496

Cost of materials

The figures that follow are the costs of main construction materials, delivered to site in the Bangkok area, as incurred by contractors in the fourth quarter of 2013. These assume that the materials would be in quantities as required for a medium-sized construction project and that the location of the works would be neither constrained nor remote. All the rates in this section exclude value-added tax (VAT).

	Unit	*Cost Bt*
Cement and aggregate		
Ordinary Portland cement in 50 kg bags	tonne	2,600
Coarse aggregates for concrete	m^3	450
Fine aggregates for concrete	m^3	350
Ready mixed concrete (mix Grade 20)	m^3	2,300
Ready mixed concrete (mix Grade 24)	m^3	2,600
Steel		
Mild steel reinforcement	tonne	24,500

Continued

	Unit	*Cost Bt*
High tensile steel reinforcement	tonne	24,500
Structural steel sections	tonne	28,000
Bricks and blocks		
Common bricks (160 × 35 × 70 mm)	1,000	800
Good-quality facing bricks (220 × 65 × 105 mm)	1,000	1,100
Hollow concrete blocks (390 × 105 × 65 mm)	1,000	3,000
Precast concrete cladding units with exposed aggregate finish	m^2	1,900
Timber and insulation		
Softwood for carpentry	m^3	30,000
Softwood for joinery	m^3	30,000
Hardwood for joinery	m^3	50,500
Exterior quality plywood (20 mm)	m^2	1,200
Plywood for interior joinery (4 mm)	m^2	250
Plywood for interior joinery (20 mm)	m^2	1,000
Softwood strip flooring (19 mm)	m^2	1,500
Softwood internal door complete with frames and ironmongery	each	8,000
Glass and ceramics		
Float glass (6 mm)	m^2	900
Plaster and paint		
Good-quality ceramic wall tiles (200 × 200 mm)	m^2	600
Plaster in 50 kg bags	tonne	1,600
Plasterboard (12 mm thick)	m^2	120
Emulsion paint in tins	gallon	550
Gloss oil paint in tins	gallon	750
Tiles and paviors		
Clay floor tiles (100 × 100 mm)	m^2	450
Vinyl floor tiles (230 × 230 × 2.0 mm)	m^2	450
Precast concrete paving slabs (500 × 500 × 50 mm)	m^2	250
Clay roof tiles	m^2	1,000
Precast concrete roof tiles (420 × 330 mm)	m^2	800
Drainage		
WC suite complete (medium quality)	each	7,000
Lavatory basin complete (medium quality)	each	3,000
100 mm diameter PVC drain pipes	m	200
150 mm diameter cast iron drain pipes	m	800

Unit rates

The descriptions that follow are generally shortened versions of standard descriptions listed in full in Chapter 19. Where an item has a two-digit reference number (e.g. 05 or 33), this relates to the full description against that number in Chapter 19. Where an item has an alphabetic suffix (e.g. 12A or 34B), this indicates that the standard description has been modified. Where a modification is major, the complete modified description is included here and the standard description should be ignored; where a modification is minor (e.g. the insertion of a named hardwood), the shortened description has been modified here but, in general, the full description in Chapter 19 prevails.

The unit rates that follow are for main work items on a typical construction project in the Bangkok area in the fourth quarter of 2013. The rates include all necessary labour, materials and equipment. Allowance of 15% to cover preliminaries and general items and 10% to cover for contractor's profit and overheads have been included in the unit rates. All the rates in this section exclude VAT.

		Unit	*Rate Bt*
Excavation			
01	Mechanical excavation of foundation trenches including earthwork support	m^3	190
02	Hardcore filling making up levels	m^3	500
Concrete work			
04	Plain *in situ* concrete in strip foundations in trenches	m^3	3,000
05	Reinforced *in situ* concrete in beds	m^3	2,800
06	Reinforced *in situ* concrete in walls	m^3	3,400
07	Reinforced *in situ* concrete in suspended floors or roof slabs	m^3	3,400
08	Reinforced *in situ* concrete in columns	m^3	3,400
09	Reinforced *in situ* concrete in isolated beams	m^3	3,400
10	Precast concrete slabs	m^2	1,300
Formwork			
11	Softwood formwork to concrete walls	m^2	550
12	Softwood formwork to concrete columns	m^2	550
13	Softwood formwork to horizontal soffits of slabs	m^2	550
Reinforcement			
14	Reinforcement in concrete walls	tonne	34,000
15	Reinforcement in suspended concrete slabs	tonne	34,000
16	Fabric reinforcement in concrete beds	m^2	150

Continued

		Unit	Rate Bt
Steelwork			
17	Fabricate, supply and erect steel-framed structure	tonne	70,000
18	Framed structural steelwork in universal joist sections	tonne	70,000
19	Structural steelwork lattice roof trusses	tonne	70,000
Brickwork and blockwork			
21A	Solid (perforated) concrete blocks (70 mm thick)	m^2	570
23A	Local one brick wall	m^2	930
Roofing			
24	Concrete interlocking roof tiles	m^2	625
33	Troughed galvanised steel roof cladding	m^2	750
Woodwork and metalwork			
36	Single glazed casement window in hardwood, size 650 × 900 mm	each	11,250
37	Two-panel glazed door in hardwood, size 850 × 2000 mm	each	12,500
38A	Solid core two hours fire resisting hardwood internal flush door, size 800 × 2000 mm with ironmongery	each	25,000
41	Hardwood skirtings	m	690
Plumbing			
42A	Light gauge galvanised sheet box gutter 150 × 100 mm	m	700
43A	PVC rainwater pipes (100 mm diameter) class 8.5	m	650
44A	100 mm diameter high-pressure polybutylene pipes for cold water supply	m	1,600
46A	100 mm diameter low-pressure polybutylene pipes for cold water distribution	m	1,400
47	UPVC soil and vent pipes (100 mm diameter)	m	650
48	White vitreous china WC suite	each	8,500
49	White vitreous china lavatory basin	each	4,500
50	Glazed fireclay shower tray	each	10,000
51	Stainless-steel single bowl sink and double drainer	each	5,500
Electrical work			
52	PVC insulated and copper sheathed cable	m	150
53A	10A unswitched socket outlet	each	550
54	Flush mounted 20A, one-way light switch	each	450

Continued

		Unit	Rate Bt
Finishings			
55	2 coats gypsum-based plaster on brick walls	m^2	250
56	White glazed tiles on plaster walls	m^2	1,000
58	Cement and sand screed to concrete floors	m^2	320
60	Mineral fibre tiles on concealed suspension system	m^2	1,200
Glazing			
61	Glazing to wood	m^2	750
Painting			
62	Emulsion on plaster walls	m^2	200
63	Oil paint on timber	m^2	250

Approximate estimating

The building costs per unit area that follow are averages incurred by building clients for typical buildings in the Bangkok area as at the fourth quarter of 2013. They are based upon the total floor area of all storeys, measured between external walls and without deduction of internal walls.

Approximate estimating costs generally include mechanical and electrical installations but exclude furniture, loose or special equipment and external works; they also exclude fees for professional services. The costs shown are for specifications and standards appropriate to Thailand and this should be borne in mind when attempting comparisons with similarly described building types in other countries. A discussion of this issue is included in Chapter 2. Comparative data for countries covered in this publication, including construction cost data are presented in Part III.

Approximate estimating costs must be treated with caution; they cannot provide more than a rough guide to the probable cost of building. All the rates in this section exclude VAT.

	Cost m^2 Bt	Cost ft^2 Bt
Industrial		
Factories for letting	16,500–20,000	1,530–1,850
Factories for owner occupation (light industrial use)	16,500–20,000	1,530–1,850
Administrative and commercial buildings		
Civic offices, non-air-conditioned	13,500–16,500	1,250–1,530
Civic offices, fully air-conditioned	15,500–18,500	1,430–1,700

Continued

	Cost m² Bt	*Cost ft² Bt*
Offices for letting, 5–10 storeys, non-air-conditioned	17,500–22,500	1,630–2,100
Offices for letting, 5–10 storeys, air-conditioned	21,000–26,000	1,950–2,400
Offices for letting, high rise, air-conditioned	21,000–26,000	1,950–2,400
Offices for owner occupation, 5–10 storeys, non-air-conditioned	17,500–22,500	1,630–2,100
Offices for owner occupation, 5–10 storeys, air-conditioned	21,000–26,000	1,950–2,400
Offices for owner occupation, high rise, air-conditioned	21,000–26,000	1,950–2,400
Prestige/headquarters office, 5–10 storeys, air-conditioned	28,000–36,000	2,600–3,350
Prestige/headquarters office, high rise, air-conditioned	28,000–36,000	2,600–3,350
Prestige retail/department store	27,500–29,500	2,550–2,740
Health and education buildings		
General hospitals (excluding specialist equipment and installation) (main hospital)	40,000–45,000	3,700–4,180
Private hospitals (excluding specialist equipment and installation) (main hospital)	50,000–60,000	4,650–5,580
Primary/junior schools	20,000–25,000	1,850–2,300
Secondary/middle schools	20,000–25,000	1,850–2,300
Recreation and art buildings		
Theatre (>500 seats) including seating and stage equipment	60,000–70,000	5,580–6,500
Theatre (<500 seats) including seating and stage equipment	65,000–75,000	6,050–6,950
Concert halls including seating	55,000–65,000	5,100–6,040
Sports hall including changing and social facilities	45,000–55,000	4,180–5,100
Swimming pools (international standard) including changing and social facilities	35,000–45,000	3,250–4,180
National museums including full air-conditioning and standby generator	55,000–65,000	5,100–6,040
Local museums including air-conditioning	45,000–55,000	4,180–5,100
Residential buildings		
Social/economic single family housing (multiple units)	16,000–20,000	1,490–1,850

Continued

	Cost m² Bt	*Cost ft² Bt*
Private/mass market single family housing 2 storey detached/semi-detached (multiple units)	25,000–30,000	2,330–2,790
Purpose designed single family housing 2 storey detached (single unit)	27,000–33,000	2,508–3,070
Social/economic apartment housing, low rise (no lifts)	15,000–20,000	1,400–1,860
Social/economic apartment housing, high rise (with lifts)	16,000–21,000	1,490–1,950
Private sector apartment building (standard specification)	22,000–28,000	2,050–2,600
Private sector apartment building (luxury)	32,000–38,000	2,970–3,530
Student/nurses halls of residence	20,000–25,000	1,860–2,330
Hotel, 5 star, city centre (inclusive of FF&E)	56,000–60,000	5,200–5,580
Hotel, 3 star, city/provincial (inclusive of FF&E)	38,000–42,000	3,530–3,900
Motel (inclusive of FF&E)	30,000–35,000	2,790–3,250
Resort hotel, 5 star (inclusive of FF&E)	56,000–80,000	5,200–7,430

Value-added tax

The standard rate of VAT is currently 7%.

Regional variations

The approximate estimating costs are based on projects in the Bangkok area. For other parts of Thailand, adjust these costs by the following factors:

Chiangmai	:	+10%
Phuket	:	+15%
Samui	:	+20%
Pattaya/Cha-Am	:	+5%

EXCHANGE RATES

Figure 17.4 plots the movement of the Thai baht against the sterling, the euro, the US dollar and 100 Japanese yen since 2003. The values used in the figure are quarterly and the method of calculating these is described, and general guidance on the interpretation of the figure are provided in Chapter 2. The average exchange rate in the fourth quarter of 2013 was Bt 51.57 to pound sterling, Bt 43.37 to euro, Bt 31.76 to US dollar and Bt 31.03 to 100 Japanese yen.

Figure 17.4 The Thai Baht against sterling, Euro, US dollar and 100 Japanese yen.

USEFUL ADDRESSES

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Website: www.boi.go.th

Department of Commercial Registration
Ministry of Commerce
44/100 Nonthaburi 1 Road

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Department of Public Works and Town & Country Planning
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Trade and Professional Associations

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Thai Contractors Association
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Chapter 18

Vietnam

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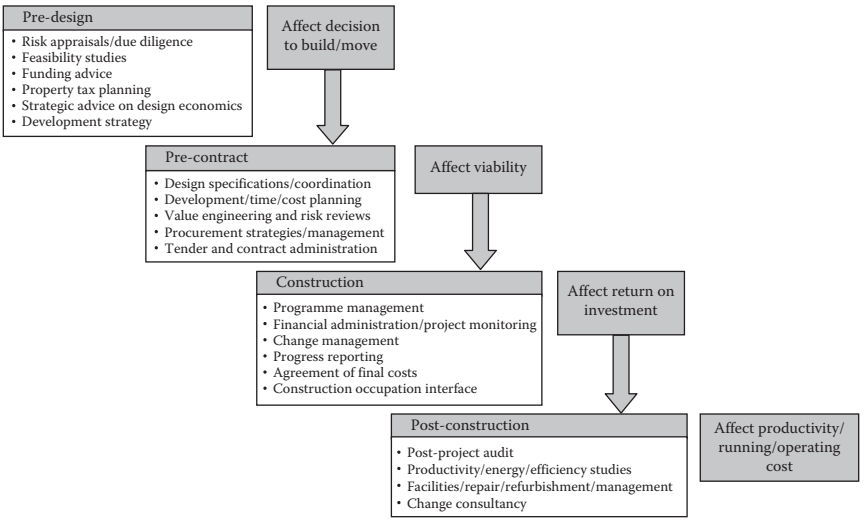

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All data relate to 2013 unless otherwise indicated.

Population	
Population	89.71 mn
Urban population	32.36%
Population under 15	24.9%
Population 65 and over	5.5%
Average annual growth rate	1.05%
Geography	
Land area	310,070 km^2
Agricultural area	30.4%
Capital city	Hanoi
Population of capital city	7.1 mn
Economy	
Monetary unit	Vietnamese dong (VND)
Exchange rate (average fourth quarter of 2013)	
The pound sterling	VND 34,178
The US dollar	VND 21,104
The euro	VND 28,724
The yen × 100	VND 21,033
Average annual inflation	6.04%
Gross domestic product (GDP)	VND 3,584,261 bn
GDP per capita	VND 40,097,600
Average annual real change in GDP	5.42%
Final consumption as a proportion of GDP	5.3%
Investment as a proportion of GDP	30.4%
Construction	
Gross value of construction output	VND 770,400 bn
Net value of construction output	N/A
Net value of construction output as a proportion of GDP	5.83%

THE CONSTRUCTION INDUSTRY

Construction outlook

Vietnam GDP in 2013 was estimated to have grown 7%, which is an improvement as compared to the 5% growth in 2012. This will be the first upturn in GDP growth since 2008. The increase in GDP is generally attributed to exports (Vietnam is producing trade surpluses) and an increase in Foreign Direct Investment (FDI).

Private domestic investment has been on decline since 2010 due to restrictions in M2 money supply and although interest rates have been falling, there remains a cap on funding into the domestic sector.

The level of non-performing loans compared with performing loans is officially circa 6% and money supply to the economy is anticipated to remain constrained until the level of non-performing loans is reduced. It is noted that the Government is taking efforts to resolve this matter and the Asset Management Company set up by the Government to manage this issue has recently been active on various debt purchasing schemes.

State investment has been falling since 2009 stimulus measures and has remained flat in 2013. There remains reliance upon Multi-lateral Development Bank (MDB) loans for the infrastructure sector after a rather procrastinated period that there is activity in respect to public private partnership initiatives. Most recently the United Kingdom Trade & Investment (UKTI) through funding and cooperation with the Vietnam Ministry of Investment has developed a framework of workable legislation, resulting in various initiatives agencies being established in collaboration with the private sector.

The macro position mentioned above has severely affected the construction market in Vietnam and construction output had fallen in 2012 and with minimal pickup in 2013. Construction output for 2014 is anticipated to remain relatively flat. Although there has been an increase of FDI into Vietnam, it is likely that this will be focussed upon asset purchase in an oversupplied market rather than on construction.

The infrastructure market yields opportunities and there is significant MDB investment in the rail sector.

In addition, there is a desperate need for all forms of infrastructure and public private partnership opportunities are being considered and developed by the Government.

Construction output

Development in all sectors has slowed during 2011 due to fiscal measures (namely interest rate increases) which have been implemented to reduce both inflation and the balance of payment deficit. FDI has also reduced during the same period as a consequence of the global liquidity problems.

There are difficulties in measuring and defining construction output. Construction output data in Vietnam is not reliable due to the nature of the political system; transparency is cited as a major hurdle for the Vietnamese Government to overcome. The three components of construction output are state funded, local private funded and international investment. The usual split is therefore one-third for each component. The construction output figures tabulated below show a real growth of 5.34% in 2013.

Year	*2005*	*2006*	*2007*	*2008*	*2009*	*2010*	*2011*	*2012*	*2013f*
Construction output (US$ billion)	3.35	4.09	4.94	5.8	6.19	7.26	7.79	5.08	5.82
Proportion of GDP (%)	6.35	6.62	6.96	6.48	6.65	7.03	6.41	5.37	5.04
Real construction output growth (%)	10.87	11.05	12.01	0.02	11.36	11.06	4.91	1.98	5.34

Source: Statistics Directory 2012 – General Statistics Office of Vietnam.

Note: '*f*' denotes forecast.

The domestic material production industry has expanded in recent years and is gradually able to meet both the anticipated and expected demand of materials. This has softened the industry's reliance on imports and stockpiling of key materials. The Vietnam Construction Materials Association has its sight on US$1.0 billion in export earnings by 2010 and aim for 25%–30% export of all Vietnam produced construction materials with 25% year-on-year growth in export volume. If this is achieved, it will increase the percentage of domestically produced materials incorporated into construction resulting in a reduction in construction costs.

The former '70% imported materials and components' rule of thumb no longer applies in Vietnam with most developers now opting for domestically produced material and components. The architectural and structural trades namely bricks, blocks, tiles, marbles and granites and joinery are all available locally and of acceptable quality for international projects but with limited selection in the domestic market. China sourced products have flooded the market of late with tiles and architectural coverings normally sourced from Thailand and Indonesia. Baked materials such as well burnt clayed brick, etc. are now restricted only for use in buildings of more than nine levels above the ground.

Cement is produced locally with supply and price being controlled by careful manipulation of supply stock. Vietnam cement is characterised with three groups of players, that is, Vietnam Cement Industry Corporation (VICEM) with 32% in terms of total sales volume from its 11 member companies; foreign players including Holcim, Chinfon and LUKS Vietnam occupying 20% of market share. The remaining 48% is contributed by many local private companies, of which notable players are The Vissai (located in Ninh Binh province), Cong Thanh Cement (located in Thanh Hoa province) and Vietnam Cement Management Ltd (located in Quang Binh province). There are currently 71 cement plants in Vietnam with integrate capacity of approx. 70 Mt/y faced with the possibility on an oversupply situation in the short to medium terms. Exports may provide some respite in the short term but for the country this is only a way to relieve the symptoms of overcapacity. Any long-term solution will involve more

decisive action. The country might look towards adopting the 'Chinese-style' environmental, economic or other regulatory drivers to force the closure of its older capacity. Supply of cement is currently not an issue in Vietnam.

Hot rolled structural steel sections are not produced in Vietnam and are normally imported from Korea, Japan, Taiwan or China. High grade pre-engineered building steel is also imported in flat plate sections and is fabricated locally to form I-beams and angles (i.e. built-up sections). Developers opting for imported reinforcement will incur import tax of 15%. Reinforcement bar steel is hot rolled in Vietnam and can be purchased with quality 'kite-marks' such as JIS. Vietnam's current consumption of steel ranks third among ASEAN countries, after Thailand and Indonesia. After skyrocketing world steel prices in 2008 and the help of Government stimulus package in 2009, the domestic steel industry suffered a setback as the real estate market growth rate slowed down due to global recession. The Vietnamese steel companies saw much lower production and consumption in 2012 and they continued to facing hardships in 2013 amid existing challenges such as high inventory, reduction in production and shortage of investment capital, bad debt of banks and the sluggishness of real estate market.

Sand (used for land filling) is now a very valuable commodity in the low-lying delta region of Southern Vietnam and the price is now carefully controlled by the formulation of cartels owned and controlled by state agencies which have recently increased prices by circa 20%–30%.

Aluminum and metalworks are often imported as there are only a few architectural metalwork production facilities in Vietnam. The frame extrusions are imported from regional source and fabricated locally. Tempered or laminated glass is available in Vietnam but mostly imported from China in varying standards. High-end developments usually use imported tempered or laminated glass from Japan and United States with the imposition of higher imported tax rate.

High-end curtain walling will involve imported frames and glass; lower end will be a hybrid of imported/local frame/glass. High-end curtain walling poses a big problem for Grade 'A' building investors as none have established in Vietnam and there seems to be a reluctance to enter the Vietnam market when order books are full elsewhere.

Vietnam exports over US$1 billion worth of furniture worldwide to the United States and Europe, accordingly fabricating joinery off-shore and importing to Vietnam is not cost effective except perhaps for the high-end developments involving highly specialist items.

Mechanical and electrical major plant and equipment such as gen-sets, chillers, split-units, water-treatment and sewage treatment packaged units, pumps and valves are still imported and regional price adjustments apply. The supply sources are generally G8 countries such as United Kingdom, United States and Japan and source depends on developer's preference.

Cabling and ductwork are produced in Vietnam but they are of inferior quality. Imported components are available from stockists or distributorships located in Hanoi and Ho Chi Minh but large quantities are likely to be imported from regional centres such as Malaysia, Thailand, China, Japan and Korea.

Characteristics and structure of the industry

The Ministry of Construction is responsible for all construction activities in Vietnam. The headquarters is located in Hanoi with a regional office in Ho Chi Minh City. The Ministry is divided into four key sections each under the jurisdiction of a Vice-Minister. These sections are: The Department of Construction Economics and Management; Science and Technology; Urban Management and Development of Construction Materials.

The Ministry is structured into departments, institutes and various construction related companies. Specific responsibilities of the four key sections are

- Construction economics and management – sets guidelines on the costs of labour, materials and plant; to advise on bidding procedures and overhead, profit and taxation allowances for state projects.
- Science and technology – approves construction standards and regulations with particular attention to the environment.
- Urban management – responsible for water supply and treatment, waste disposal, construction of low-income housing and approval of each province's master plan.
- Development of construction materials – promotes and gears foreign investment in domestic resources such as cement, bricks, sanitary ware and roofing products in order to realise the benefits of the forecast increase in demand in products of an international standard both in Vietnam and for the potential export market.

To proceed with the construction of any development, the investor would need to register for a Construction Investment Licence. The procedures for obtaining the Construction Investment Licence are generally prescribed in the Law on Construction for Investment Projects for Construction Works.

- For *very large projects* (investment level not defined), the investor will need to prepare a Construction Investment Report for the approval by the Prime Minister.
- For *other projects*, the investor will need to ensure that the project complies with General Master Planning requirements accordingly. Documentation must be submitted to the Ministry of Planning and Investment (MPI).

Following Construction Investment Approval as discussed above and assuming a joint venture structure with the local land owner (as discussed in detail in the next section), the next step in the sequence of development procedures is to ensure that the project complies with Municipal Master Plans. The procedure is generally prescribed as follows:

- Planning permission must be obtained by the investor from the Municipal Chief Planning Architectural Department.

Once planning permission has been obtained, a feasibility study and basic design must then be prepared and submitted to the Construction Department for approval. It is prudent at this stage to consider the appointment of a local architect in order to follow through the design steps required.

- The feasibility study now renamed as 'Project for Construction of Work' and will comprise:
  - Master plan
  - General project explanation
  - Basic design drawings
  - Total investment cost
- Technical design can be prepared once basic design is approved.
- The technical design shall be appraised by an independent third party and this shall be organised by the investor. The technical design must also be submitted to the Fire and Police Department for approval.
- Once the technical design has been appraised, detailed drawings (construction drawings) are prepared and again appraised by an independent third party as organised by the investor.
- The construction permit will be issued by the Construction Department following receipt of the detailed drawings.
- The tender for construction works may be issued in parallel to obtain the construction permit. However, works above ground level cannot commence on site until the construction permit has been granted.

Other important organisational bodies which need to be considered within Vietnam comprise:

Provincial People's Committee: Each province has a separate People's Committee whose responsibilities include determining the project's compliance with the appropriate development plan, evaluation of the project assets, financial status of the relevant parties, organisation of utility supply of the project (if relevant) and determining land use ownership, rights and terms. All new Representative Offices must register with the People's Committee of the province in which the office will be located.

The Chamber of Commerce and Industry (CCI): The CCI is an independent, non-government organisation whose functions are to promote

trade and investment in Vietnam and abroad; to represent the Vietnamese business community for the promotion and protection of its interests in domestic and international relations; to serve as a forum for exchange of information between investment enterprises and the State on matters concerning the economic activity and business environment in Vietnam.

The Vietnamese Union of Architects (VUA): The VUA is based in Hanoi and has branches throughout the country. The Union is a member of the International Union of Architects and, theoretically, has links with similar institutions around the world. Provincial branches of the Architects' Union are similarly organised and performed similar functions as the National Union in Hanoi.

The Vietnam Consultant Association (VECAS): VECAS is a professional body representing consultants and providing both educational and publication services to consultants throughout Vietnam. VECAS is a Member of International Federation of Consulting Engineers (FIDIC) and published FIDIC Contracts in Vietnamese and English, and a key organisation in the development and internationalisation of the Vietnam construction industry.

Selection of contractors

There are four unofficial tiers of contractors available for tendering foreign investment projects.

Tier 1	Foreign contractors from Japan, Korea, Singapore, Hong Kong, Europe and Australia
Tier 2	Foreign contractors from China, Russia, Taiwan and Malaysia
Tier 3	Local private contractors or joint stock companies
Tier 4	State contractors

There is a considerable diversity between these tiers in terms of general expertise, technological know-how, human-resource skills and training which leads to a different risk profile for delivery of buildings in terms of time, quality and cost targets. The lowest tiers use less modern equipment, machinery and system formwork and have much lower human resource costs. However, all tiers are currently experiencing full order books and speculating as to which projects are more viable in terms of their own risk/benefit assessments. This has inevitably lead to higher tender price return. A rigorous pre-qualification procedure is recommended with weighted scoring in line with project objectives, for example, lowest cost objective will have an inevitable impact on quality and time.

A typical pre-qualification assessment might cover (indicative weighting for Vietnam 1–10, with 10 being the highest)

- Vietnam experience (if foreign): 8
- Project-type experience (local and foreign): 7
- Financial capacity (particularly local): 8
- Plant and equipment inventory (particularly local): 7
- Direct labour strength (local and foreign): 6
- Proposed joint venture/sub-contracting arrangements (local and foreign): 7
- Planning and schedule capability (particularly local): 8
- Cognizance of international procedures, codes and specifications (local): 8

Clients and finance*

Till the end of 2013, Vietnam had 15,600 FDI projects with the total registered capital of US$230 billion. Industry and construction accounted for highest proportion of 61% of total projects and 58% of total registered capital. One hundred and one countries and territories were investing in Vietnam. Four leading investment countries including Japan, Singapore, Korea and Taiwan made up to 53% of total registered capital.

Official Development Assistance (ODA) has resumed to Vietnam since 1993 and ODA's commitment has been continuously increasing annually from 2008. During the period 2008–2013, total ODA's commitment valued at US$ 1.1 billion, mostly from large donors such as Japan, World Bank, Asian Development Bank and United Nations agencies. ODA has made significant contribution to the development of Vietnam, accounting for 11% of total social investment and 17% of investment from the budget. The majority of this aid money is to be channelled into infrastructure development, improvement and technical assistance programs. Since 2010, when Vietnam reached the middle-income level (GDP per capita over US$ 1,000), high concessional ODA will no longer be provided.

Selection of consultants

The selection of consultants for public invested projects should comply with Law on Tendering and Decree 12/2009/ND-CP on management of construction investment projects. The Prime Minister also issued Decision 131/2007/QD-TTg to provide regulations on employing foreign consultants to carry out construction activities in Vietnam. It is important for all foreign investors to be aware of these regulations prior to making final selection of consultants. Foreign clients usually select the design consultants known to them or those who have a reputation for a specific type of building. In past years, these foreign design consultants tend to come from their

* Source: Ministry of Planning and Investment.

own countries; however, recently there appears to be a move to use more local consultants.

In late 2009, the Government issued Decree 112/2009/ND-CP titled 'Government Decree on Cost Management in Civil Engineering Investment' to replace the Decree 99/2007/ND-CP. This Decree is in many ways a milestone piece of legislation which acknowledged the need for further market reforms and better cost management within the Government sector. This decree called for the need for suitably qualified Cost Management consultants.

Foreign banks providing ODA investment also publish their own requirements, which must be adhered to and accordingly contract documents in such circumstances must be compliant to: The International Standard General Contract Conditions Vietnam Legislation and ODA Guidelines.

Contractual arrangements

The primary consideration in the choice of procurement strategy is the need to obtain overall value for money during the entire life of the facility and each method has a different risk profile for the employer and the contractor. In Vietnam, the following is currently prevalent.

- Traditional lump sum – high extent
- Management contracting – low extent
- Construction management – medium to high extent
- Design and construct – low extent
- Prime contracting – low extent
- Framework agreements – rising extent

Most if not all projects in Vietnam are tendered in competition and the process is covered by the Law of Tendering promulgated in 2006 intended primarily for state projects defined as over 30% total investment capital by a state entity and for Vietnamese private firms. Foreign investors do not need to follow the Law of Tendering although it is advisable. The law recognises open tendering, limited tendering and competitive tendering. For state projects, tenders are normally sought using a 'two-envelope system', that is, technical and financial, the former being opened first to check for compliance.

Most foreign entities shortlist tendering contractors by having a robust pre-qualification procedure for checking financial and technical competencies. Tenders are usually valid for 90 days.

The FIDIC suite of contracts is widely used for Vietnam construction contracts with the 1999 Red Book being now widely accepted for building sectors whilst Yellow Book and Silver Book are gradually widely applicable to industrial and infrastructure sectors. There are official translations of

some of the FIDIC forms and the VECAS is an official member of FIDIC. Most ODA projects in Vietnam adopt FIDIC also.

Development control and standards

The MPI, the successor to the State Committee for Cooperation and Investment (SCCI), is the body responsible for control of all foreign investments in Vietnam and for issuing investment licences. The MPI's role is to circulate investment licence applications among the various Ministries and relevant People's Committee for the region. The MPI's head office is in Hanoi with a representative office in Ho Chi Minh City. The various departments within the MPI cover Project Evaluation, Investment Promotion, General Office, Information and Legislation.

The Project Evaluation Department's role is to determine whether an investment proposal is in accordance with the best interests of the State. During the evaluation process, which can take up to 3 months, questions from the various Ministries must be answered within a stipulated time frame (which at the time of publishing is 45 days), after which the application is deemed to have lapsed. The MPI provides pro-forma applications and documents and encourages reference to previously successful application to limit abortive time. After the evaluation process, an investment licence is either issued or the application is rejected.

All foreign investors are required to register their financial accounting practices with the Ministry of Finance. Regular reports on the financial standing of an enterprise must be submitted. The Ministry of Finance also advises the MPI on fiscal matters such as taxation levels, subsidies and incentives for the various forms of foreign investment.

CONSTRUCTION COST DATA

Cost of labour

The figures that follow are typical of labour costs in Vietnam as at the fourth quarter of 2013 for joint venture/international projects. The cost of labour indicates the cost to a contractor for employing that employee.

	Cost of labour (per day) US$	*Number of hours worked per year*
Site operatives		
Bricklayer	17.51	2,336
Carpenter	15.32	2,336
Plumber	21.89	2,336

Continued

	Cost of labour (per day) US$	*Number of hours worked per year*
Electrician	21.89	2,336
Structural steel erector	17.51	2,336
Welder	17.51	2,336
Labourer	9.47	2,336
Equipment operator	31.72	2,336

Cost of materials

The figures that follow are the costs of main construction materials delivered to site in Vietnam as incurred by contractors in the fourth quarter of 2013. These assume that the materials would be in quantities as required for a medium-sized construction project and that the location of the works would be neither constrained nor remote.

	Unit	*Cost US$*
Cement and aggregate		
Ordinary Portland cement in 50 kg bags	tonne	75.00
Coarse aggregates for concrete 40 mm	m^3	7.69
Fine aggregates for concrete 20 mm	m^3	9.13
Ready mixed concrete (Grade 40)	m^3	62.38
Ready mixed concrete (Grade 35)	m^3	59.39
Ready mixed concrete (Grade 20)	m^3	51.21
Steel		
Mild steel reinforcement	tonne	710.00
High tensile steel reinforcement	tonne	690.00
Structural steel sections	tonne	710.00
Bricks		
Hollow concrete blocks (390 × 190 × 100 mm)	1,000	405.00
Well burnt clay brick unit (80 × 80 × 180 mm)	1,000	50.00
Timber and insulation		
Hardwood for joinery	m^3	645.00
Exterior quality plywood (12 mm)	m^2	10.60
Plywood for interior joinery (12 mm)	m^2	8.00
50 mm thick quilt insulation (16 kg/m^3)	m^2	2.00
50 mm thick rigid slab insulation (60 kg/m^3)	m^2	5.50
Hardwood internal door complete with frames and ironmongery	each	310.00

Continued

	Unit	*Cost US$*
Glass and ceramics		
Float glass (6 mm)	m^2	8.60
Laminated glass (10.38 mm)	m^2	17.80
Tempered glass 8 mm	m^2	13.20
Plaster and paint		
Good quality ceramic wall tiles (300 × 300 × 8 mm)	m^2	12.50
Good quality homogeneous wall tiles (600 × 1200 × 11 mm)	m^2	35.00
Good quality marble wall tiles (600 × 1200 × 20 mm)	m^2	107.10
Good quality granite wall tiles (600 × 1200 × 20 mm)	m^2	89.30
Plasterboard (12.7 mm thick) – gypsum	m^2	3.70
Emulsion paint in 5 litre tins	litre	3.60
Gloss oil paint in 5 litre tins	litre	4.40
Tiles and paviors		
Clay floor tiles (200 × 200 × 20 mm)	m^2	6.30
Vinyl floor tiles (300 × 300 × 2 mm)	m^2	8.50
Clay roof tiles	m^2	6.20
Precast concrete roof tiles	1,000	640.00
Drainage		
WC suite complete	each	231.20
Wash hand basin complete	each	137.60
100 mm diameter PVC pipes	m	7.50
150 mm diameter PPR pipes (local product for cold water)	m	50.00
150 mm diameter cast iron drain pipes (medium grade)	m	42.00

Unit rates

The descriptions that follow are generally shortened versions of standard descriptions listed in full in Chapter 19. Where an item has a two-digit reference number (e.g. 05 or 33), this relates to the full description against that number in Chapter 19. Where an item has an alphabetic suffix (e.g. 12A or 34B), this indicates that the standard description has been modified. Where a modification is major, the complete modified description is included here and the standard description should be ignored; where a modification is minor (e.g. the insertion of a named hardwood), the shortened description has been modified here but, in general, the full description in Chapter 19 prevails.

The unit rates that follow are for main work items on a typical joint venture/international project in Vietnam in the fourth quarter of 2013. The rates include all necessary labour, materials and equipment. An allowance of 12% has been added to the rates to cover preliminary and general items.

		Unit	*Rate US$*
Excavation			
01	Mechanical excavation of foundation trenches	m^3	4.22
02	Hardcore filling making up levels; 150 mm thick	m^3	14.52
Concrete work			
04	Plain *in situ* concrete in strip foundations in trenches (Grade 20)	m^3	81.70
05A	Reinforced *in situ* concrete in beds (Grade 35)	m^3	90.50
06A	Reinforced *in situ* concrete in walls (Grade 35)	m^3	97.50
07A	Reinforced *in situ* concrete in suspended floors or roof slabs (Grade 35)	m^3	95.20
08A	Reinforced *in situ* concrete in columns (Grade 35)	m^3	97.50
09A	Reinforced *in situ* concrete in isolated beams (Grade 35)	m^3	95.20
Formwork			
11A	Waterproof plywood formwork to concrete walls	m^2	11.20
12A	Waterproof plywood formwork to concrete columns	m^2	11.20
13A	Waterproof plywood formwork to horizontal soffits of slabs	m^2	10.53
Reinforcement			
14	Reinforcement in concrete walls	tonne	1,014.74
15	Reinforcement in suspended concrete slabs	tonne	1,006.62
16	Fabric reinforcement in concrete beds	m^2	4.59
Steelwork			
17	Fabricate, supply and erect steel framed structure	tonne	2,074.00
19	Structural steelwork lattice roof trusses	tonne	2,074.00
Brickwork and blockwork			
20	Precast lightweight aggregate hollow concrete block walls	m^2	15.91
21A	Solid (perforated) concrete blocks	m^2	19.75
23	Facing bricks (215 mm thick)	m^2	18.22

Continued

		Unit	*Rate US$*
Roofing			
25A	Plain clay roof tiles 200 × 200 mm	m^2	12.96
29	Three layers glass-fibre-based bitumen felt roof covering	m^2	20.84
33	Troughed galvanised steel roof cladding	m^2	15.13
Woodwork and metalwork			
34	Preservative-treated sawn hardwood 50 × 100 mm	m	9.40
35	Preservative-treated sawn hardwood 50 × 150 mm	m	13.00
37A	Two-panel glazed door in oak hardwood, size 850 × 2000 mm	each	268.00
38	Solid core half hour fire resisting hardwood internal flush door, size 800 × 2000 mm	each	230.00
39	Aluminium double-glazed window, size 1200 × 1200 mm	each	175.00
41	Hardwood skirtings	m	7.82
Plumbing			
42	UPVC half round eaves gutter	m	18.50
43A	UPVC rainwater pipes; 300 mm diameter	m	35.50
44	Light gauge copper cold water tubing	m	13.40
45	High-pressure plastic pipes for cold water supply	m	6.80
47	UPVC soil and vent pipes	m	24.50
48	White vitreous China WC suite	each	231.62
49	White vitreous China wash hand basin	each	123.10
51A	Stainless steel double bowl sink and double drainer	each	125.16
Electrical work			
52	PVC insulated and copper sheathed cable	m	4.80
53	13 amp unswitched socket outlet	each	15.00
54	Flush mounted 20 amp, one-way light switch	each	12.00
Finishing			
55A	Two coats cement and sand (1:4) plaster on brick walls	m^2	3.50
56	White glazed tiles on plaster walls	m^2	18.86
57	Red clay quarry tiles on concrete floors	m^2	16.10
58	Cement and sand screed to concrete floors (20 mm thick)	m^2	2.94
59	Thermoplastic floor tiles on screed	m^2	27.25
60	Mineral fibre tiles on concealed suspension system	m^2	26.00
Glazing			
61	Glazing to wood	m^2	8.00
Painting			
62	Emulsion on plaster walls	m^2	3.44
63	Oil paint on timber	m^2	3.91

Approximate estimating

The building costs per unit area that follow are averages incurred by building clients for joint venture/international projects in Vietnam as at the fourth quarter of 2013. They are based upon the total floor area of all storeys, measured between external walls and without deduction of internal walls.

Approximate estimating costs generally include mechanical and electrical installations but exclude furniture, loose or special equipment and external works; they also exclude fees for professional services. The costs shown are for specifications and standards appropriate to Vietnam and this should be borne in mind when attempting comparisons with similarly described building types in other countries. A discussion of this issue is included in Chapter 2. Comparative data for countries covered in this publication, including construction cost data are presented in Part III.

Approximate estimating costs must be treated with caution; they cannot provide more than a rough guide to the probable cost of building.

	Cost m² US$	*Cost ft²* US$
Industrial buildings		
Factories for letting	281	26
Factories for owner occupation (light industrial use)	291	27
Factories for owner occupation (heavy industrial use)	432	40
Factory/office (high tech) for owner occupation (controlled environment, fully finished)	432	40
Warehouses, low bay (6–8 m high) for letting	281	26
Warehouses, low bay for owner occupation	281	26
Warehouses, high bay for owner occupation	342	32
Administrative and commercial buildings		
Offices for letting, 5–10 storeys, non-air-conditioned	583	54
Offices for letting, 5–10 storeys, air-conditioned	653	61
Offices for letting, high rise, air-conditioned	784	73
Offices for owner occupation, high rise, air-conditioned	915	85
Prestige/headquarters office, 5–10 storeys, air-conditioned	714	66
Prestige/headquarters office, high rise, air-conditioned	1,015	94
Residential buildings		
Purpose designed single family housing 2-storey detached (single unit)	543	50
Social/economic apartment housing, high rise (with lifts)	503	47
Private sector apartment buildings (standard specification)	643	60
Private sector apartment buildings (luxury)	844	78
Hotel, 5 star, city centre	1,750	163
Hotel, 3 star, city/provincial	1,467	136

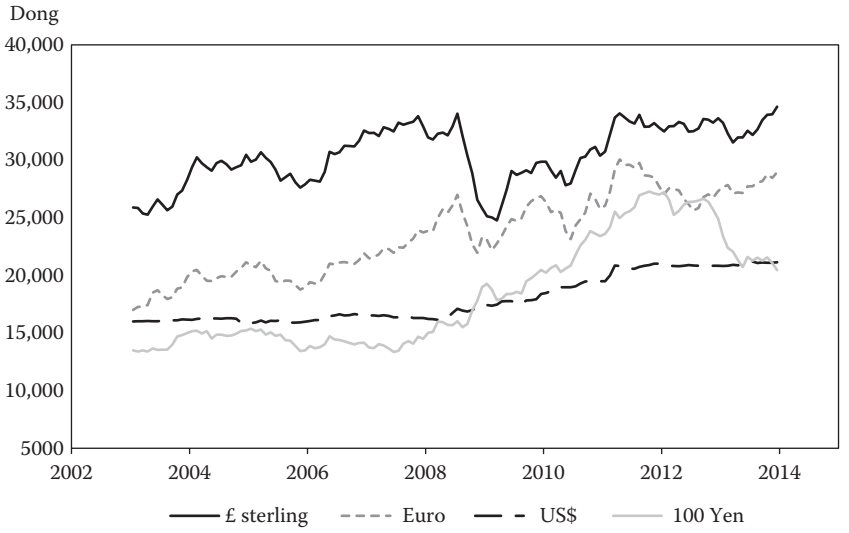

Figure 18.1 The Vietnam dong against sterling, euro, US dollar and 100 Japanese yen.

EXCHANGE RATES

Figure 18.1 plots the movement of the Vietnamese dong against the sterling, the euro, the US dollar and 100 Japanese yen since 2003. The values used in the figure are quarterly and the method for calculating these is described, and general guidance on the interpretation of the figure are provided in Chapter 2. The average exchange rates in the fourth quarter of 2013 were VND 34,178 to pound sterling, VND 28,724 to euro, VND 21,104 to US dollar and VND 21,033 to 100 Japanese yen.

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Chapter 19

Amplified descriptions of construction items

EXCAVATION

(Assume excavation in firm soil)

1. Mechanical excavation of foundation trenches; starting from ground level (including removal of excavation material from site); over 0.30 m wide, not exceeding 2.00 m deep.
2. Hardcore filling in making up levels; hard brick, broken stone (or sand where appropriate); crushed to pass a 100 mm ring 150 mm deep.
3. Earthwork support; sides of trench excavation; distance between opposing faces not exceeding 2.00 m; maximum depth 2.00 m.

CONCRETE WORK

(Formwork and reinforcement measured separately)

4. Plain *in situ* concrete in strip foundations in trenches 20 N/mm^2; ordinary Portland cement, 20 mm coarse aggregate; size 500 mm wide × 300 mm thick.
5. Reinforced *in situ* concrete in beds 20 N/mm^2; ordinary Portland cement, 20 mm coarse aggregate; 200 mm thick.
6. Reinforced *in situ* concrete in walls 20 N/mm^2; ordinary Portland cement, 20 mm coarse aggregate; 200 mm thick.
7. Reinforced *in situ* concrete in suspended floor or roof slabs 20 N/mm^2; ordinary Portland cement, 20 mm coarse aggregate; 150 mm thick.
8. Reinforced *in situ* concrete in columns 20 N/mm^2; ordinary Portland cement, 20 mm coarse aggregate; size 400 × 400 mm.
9. Reinforced *in situ* concrete in isolated beams 20 N/mm^2; ordinary Portland cement, 20 mm coarse aggregate; size 400 × 600 mm deep.

10. Precast concrete slabs (including reinforcement as necessary); contractor designed for total loading of 3 N/mm^2; 5.00 m span.

FORMWORK

(Assume a simple repetitive design which allows three uses of formwork)

11. Softwood or metal formwork to concrete walls; basic finish; (one side only).
12. Softwood or metal formwork to concrete columns; basic finish; columns 1600 mm girth.
13. Softwood or metal formwork to horizontal soffits of slabs; basic finish; slabs 150 mm thick, not exceeding 3.50 m high.

REINFORCEMENT

14. Reinforcement in concrete walls; hot-rolled high tensile bars cut, bent and laid, 16 mm diameter.
15. Reinforcement in suspended concrete slabs; hot-rolled high tensile bars cut, bent and laid, 25 mm diameter.
16. Fabric (mat) reinforcement in concrete beds (measured separately); weight approximately 3.0 kg/m^2; laid in position with 150 mm side and end laps.

STEELWORK

17. Fabricate, supply and erect steel-framed structure; including painting all steel with one-coat primer.
18. Framed structural steelwork in universal joist sections; bolted or welded connections, including erecting on site and painting one coat at works.
19. Structural steelwork lattice roof trusses; bolted or welded connections, including erecting on site and painting one coat at works.

BRICKWORK AND BLOCKWORK

(Assume a notional thickness of 100 mm for bricks and blocks. Rates should be for the nearest standard size to 100 mm.)

20. Precast lightweight aggregate hollow concrete block walls; gauged mortar; 100 mm thick.

21. Solid (perforated) clay or concrete common bricks (priced at… per m^2 delivered to site); gauged mortar; 100 mm thick walls.
22. Solid (perforated) sand lime bricks (priced at… per m^2 delivered to site); gauged mortar; 100 mm thick walls.
23. Facing bricks (priced at… per m^2 delivered to site); gauged mortar, flush pointed as work proceeds; half-brick thick walls.

ROOFING

24. Concrete interlocking roof tiles 430 × 380 mm (or nearest equivalent); on and including battens and underfelt; laid to 355 mm gauge with 75 mm laps (excluding eaves fittings or ridge tiles).
25. Plain clay roof tiles 260 × 160 mm (or nearest equivalent); on and including battens and underfelt; laid to 100 mm lap (excluding eaves fittings or ridge tiles).
26. Fibre cement roof slates 600 × 300 mm (or nearest equivalent); on and including battens and underfelt; laid flat or to fall as coverings for roofs.
27. Sawn softwood roof boarding, preservative treated 25 mm thick; laid flat or to fall.
28. Particle board roof coverings with tongued and grooved joints 25 mm thick; laid flat or to fall.
29. Three layers of glass-fibre-based bitumen felt roof covering; finished with limestone chippings in hot bitumen; to flat roofs.
30. Bitumen-based mastic asphalt roof covering in two layers; on and including sheathing felt underlay, with white chippings finish; to flat roofs.
31. Glass-fibre mat roof insulation 160 mm thick; laid flat between ceiling joists.
32. Rigid sheet resin-bonded loadbearing glass-fibre roof insulation 75 mm thick; laid on flat roofs.
33. 0.8 mm troughed galvanized steel roof cladding in single spans of 3.00 m with loading of 0.75 kN/m^2; fixed to steel roof trusses with bolts; to pitched roofs.

WOODWORK AND METALWORK

(Hardwood should be assumed to be of reasonable exterior quality)

34. Preservative-treated sawn softwood; size 50 × 100 mm; framed in partitions.
35. Preservative-treated sawn softwood; size 50 × 150 mm; pitched roof members.

36. Single-glazed casement window in (…) hardwood including hardwood frame and sill; including steel butts and anodized aluminium espagnolette bolt; size approximately 650 × 900 mm with 38 × 100 mm frame and 75 × 125 mm sill.
37. Two panel door with panels open for glass in (…) hardwood including hardwood frame and sill; including glazing with 6 mm wired polished plate security glass fixed with hardwood beads and including steel butts, anodized handles and push plates and security locks; size approximately 850 × 2000 mm with 38 × 100 mm frame and 38 × 150 mm sill.
38. Solid core half hour fire-resisting hardwood internal flush door lipped on all edges; unpainted, including steel butts, anodized handles and push plates and mortice lock; size approximately 800 × 2000 mm.
39. Aluminium double-glazed window and hardwood sub-frame; standard anodized horizontally sliding double glazed in (…) hardwood sub-frame and sill; including double glazing with 4 mm glass, including all ironmongery; size approximately 1200 × 1200 mm with 38 × 100 mm sub-frame and 75 × 125 mm sill.
40. Aluminium double-glazed door set and hardwood sub-frame; standard anodized aluminium, double glazed in (…) hardwood sub-frame and sill; including double glazing with 4 mm glass, including all ironmongery; size approximately 850 × 2100 mm with 38 × 100 mm subframe and 75 × 125 mm sill.
41. Hardwood skirtings. Wrought (…) hardwood; fixed on softwood grounds; size 20 × 100 mm.

PLUMBING

(Sizes of sanitary installations and pipes are indicative)

42. UPVC half round eaves gutter; screwed to softwood at 1.00 m centres; 110 mm external diameter (excluding bends and outlets).
43. UPVC rainwater pipes with pushfit joints; screwed to brickwork at 1.50 m centres; 100 mm external diameter (excluding bends and outlets).
44. Light gauge copper cold water tubing with compression or capillary fittings; screwed to brickwork horizontally at 1.00 m centres; 15 mm external diameter.
45. High-pressure polypropylene, polythene or UPVC (as appropriate) pipes for cold water supply; fixed horizontally to brick walls at 1.00 m centres; 15 mm external diameter, complete with fittings.
46. Low-pressure polypropylene, polythene or UPVC (as appropriate) pipes for cold water distribution; with plastic compression fittings 20 mm external diameter, laid in trenches.

47. UPVC soil and vent pipes with solvent welded or ring seal joints; fixed vertically to brickwork with brackets at 1.50 m centres; 100 mm external diameter.
48. White vitreous china WC suite with plastic seat and cover and plastic low-level cistern, 9 L capacity; complete with ball valve and float and flush pipe to WC suite; fixed to concrete.
49. White vitreous china lavatory basin with 2 No. chrome-plated taps (or medium quality chrome plated mixer taps); including plug, overflow and waste connections (excluding trap); size approximately 560 × 400 mm, fixed to brickwork with concealed brackets.
50. Glazed fireclay shower tray; including overflow and waste (excluding trap); size approximately 750 × 750 × 175 mm, fixed to concrete.
51. Stainless-steel single bowl sink and double drainer (excluding taps); including plug, overflow and connections (excluding trap); size approximately 1500 × 600 mm, fixed to softwood sink unit (excluding sink base).

ELECTRICAL WORK

52. PVC insulated and copper-sheathed cable, 450/750 V grade, twin core and ECC 6 mm^2 cross-sectional area; fixed to timber with clips.
53. 13 amp, 2 gang flush-mounted white, unswitched socket outlet; including 6.0 m of 2.5 mm^2 concealed PVC insulated copper cable (excluding conduit); flush mounted to brickwork including all fittings and fixing as necessary.
54. Flush-mounted 20 A, 2 gang, 1 way white light switch; including 6.0 m of 1.5 mm^2 concealed mineral insulated copper cable (excluding conduit); flush mounted to brickwork including all fittings and fixings as necessary.

FINISHINGS

55. Two-coats gypsum-based plaster on brick walls 13 mm thick; floated finish.
56. White glazed tiles on plaster walls size 100 × 100 × 4 mm; fixed with adhesive and grouted between tiles.
57. Red clay quarry tiles on concrete floors size 150 × 150 × 16 mm; bedded and jointed in mortar.
58. Floor screed; cement and sand screed to concrete floors 1:3 mix; 50 mm thick; floated finish.
59. Thermoplastic floor tiles on screed 2.5 mm thick; fixed with adhesive.

60. Suspended ceiling system; fissured mineral fibre tiles size 300 × 300 × 15 mm; on galvanized steel concealed suspension system; fixed to concrete soffits with 500 mm drop (excluding lamp fittings).

GLAZING

61. Glazing to wood; ordinary quality 4 mm glass; softwood beads.

PAINTING

62. Emulsion on plaster walls; one-coat diluted sealer coat and two-coats full vinyl emulsion paint.
63. Oil paint on timber; one-coat primer and two-coats oil-based paint.

Part III

Comparative data

Chapter 20

Introductory notes

Part III brings together data from a variety of sources but mainly Part II, and presents them in the form of tables to allow rapid comparison of data among the countries included in the book. This also helps place countries, their main statistical indicators and their construction costs in an international context.

There are 19 tables derived from Part II arranged in three sections:

Key national indicators

- Population
- The economy
- Geography

Construction output indicators

- Construction output
- Construction output per capita

Construction cost data

- Mason/bricklayer and unskilled labour costs
- Site manager and qualified architect labour costs
- Material costs – Cement and concrete aggregates
- Material costs – Ready mixed concrete and reinforcement steel
- Material costs – Common bricks and hollow concrete blocks
- Material costs – Softwood for joinery and quilt insulation
- Material costs – Sheet glass and plasterboard
- Material costs – Emulsion paint and vinyl floor tiles
- Approximate estimating – Factories and warehouses
- Approximate estimating – Offices
- Approximate estimating – Housing

- Approximate estimating – Hospitals and schools
- Approximate estimating – Theatres and sports halls
- Approximate estimating – Hotels

The first five tables are based on the key data sheets at the beginning of each country section, the remainder are drawn from the construction cost data in each country section. Each table is prefaced by explanatory notes. There are inherent dangers in attempting to compare international data, particularly where two sets of data are used (e.g. construction output and population) and, even more so, when exchange rates are used. While these tables can provide useful initial comparisons between countries they should, nevertheless, be used with caution.

Chapter 21

Key national indicators

POPULATION

The table below summarises population statistics for all 16 countries included in this book. The table highlights not only the differences in total population among the countries but also variations in the distribution of population between age groups within countries, in population growth rates and in the proportion of the population living in urban areas.

The table includes the most populous country in the world (China) and three others from the top 10 most populous countries (India, Indonesia and Japan). The developed countries generally have high rates of urbanisation (Hong Kong and Singapore). The developed countries also have relatively low proportions of population under 15 and relatively high populations over 65.

Population growth rates vary from less than 1% per annum in the China, Hong Kong, Japan, Myanmar, South Korea, Sri Lanka and Thailand to over 2% in Singapore and Taiwan.

	Population				
Country	*Total (mn)*	*Urban %*	*Under 15%*	*Over 65%*	*Growth % pa*
Brunei	0.4	76	24	4	1.7[a]
Cambodia	15.4	20	31	5	1.5
China	1,361.0	54	18	10	0.5[b]
Hong Kong	7.2	94	11	15	0.7[b]
India	1,270.0	31	35	5	1.6
Indonesia	251.2	51	27	6	1.9[c]
Japan	127.2	67	13	25	−0.2
Malaysia	29.9	71	26	6	1.6[c]
Myanmar	52.8	33	25	5	0.8[d]
Philippines	92.3	66	33	4	1.9[e]
Singapore	5.4	100	16	11	2.1[c]

Continued

	Population				
Country	*Total (mn)*	*Urban %*	*Under 15%*	*Over 65%*	*Growth % pa*
South Korea	49.2	82	15	12	0.6[f]
Sri Lanka	20.5	15	25	8	0.8
Taiwan	23.4	65	14	12	2.9[g]
Thailand	64.9	34	18	15	0.5[h]
Vietnam	89.7	32	25	6	1.1

Note: All data relate to 2013 unless otherwise indicated.

[a] 2014 data.
[b] 2008–2013 data.
[c] 2010–2013 data.
[d] 2012 data.
[e] 2000–2010 data.
[f] 2008–2012 data.
[g] 2009–2013 data.
[h] 2003–2013 data.

THE ECONOMY

This table summarises economic data for the countries included in this book. In the country sections, GDP figures are given in national currencies (unless otherwise stated); here they have been converted into US dollars using the average exchange rate in the fourth quarter of 2013. The table contains two of the wealthiest nations in the world – China and Japan – and some of the poorest. As with population density, GDP per capita is a more helpful measure of national wealth than total GDP. Brunei has one of the highest GDP per capita in the world while total GDP is less than a tenth of neighbouring Malaysia.

The GDP growth rates are perhaps more interesting indicators of potential wealth. The growth rates are real, that is the effects of inflation are excluded. With the exception of Malaysia, average annual inflation in all countries is below 10%, often well below.

	2013			
Country	*GDP US$ bn*	*GDP per capita US$*	*GDP growth (real) % pa*	*Inflation rate % pa*
Brunei	22.25	54,800.00	2.2	1.0
Cambodia	13.84[a]	992.73	7.0	3.0
China	9,294.93	6,829.41	9.0[b]	2.6
Hong Kong	270.58	37,642.32	2.5[c]	4.4
India	1,841.70	1,106.80	4.7[d]	8.8
Indonesia	729.26[a]	2,953.67[a]	5.4[e]	8.4

Continued

Country	2013 GDP US$ bn	2013 GDP per capita US$	2013 GDP growth (real) % pa	2013 Inflation rate % pa
Japan	4,633.33	36,343.14	2.3	−1.4
Malaysia	245.02	8,181.93	12.0[f]	2.0
Myanmar	53.83	882.75	9.3[g]	3.5
Philippines	266.21	2,711.20	4.5[c]	3.0
Singapore	291.12	55,240.00	4.8[b]	2.4
South Korea	1,198.17[a]	23,290.96[a]	4.9[b]	1.3
Sri Lanka	66.21	3,232.57	7.3	4.7
Taiwan	490.18	20,997.77	3.3[h]	0.8
Thailand	374.59	5,774.62	4.1[i]	2.2
Vietnam	169.84	1,900.00	5.4	6.0

Note: All data relate to 2013 unless otherwise indicated.

[a] 2012 data.
[b] 2008–2013 data.
[c] 1998–2013 data.
[d] 2013–2014 data.
[e] 2000–2013 data.
[f] 2010–2013 data.
[g] 1998–2007 data.
[h] 2009–2013 data.
[i] 2001–2013 data.

GEOGRAPHY

The table below summarises geographical statistics for the countries included in this book. As with population, the table highlights the differences between countries. It includes one of the largest countries in the world (China); it also includes two of the smallest (Hong Kong and Singapore).

The figures for population density and the percentage of national population in the largest city are perhaps more helpful indicators of land use than total area. For example, Singapore has one of the highest population densities in the world with over 7,000 persons per km^2. The percentage of national population in the largest city gives an indication of the relative importance of that city – usually the capital.

Country	Land area Total 000 km^2	Land area Agriculture area %	Population in the largest city per km^2	Population in the largest city 000's	Population in the largest city % of total
Brunei	5.27	0.5	80.28	241	60.3
Cambodia	181.04	32.0[a]	85.12	1,502	9.8

Continued

	Land area		*Population in the largest city*		
Country	*Total 000 km²*	*Agriculture area %*	*per km²*	*000's*	*% of total*
China	9,600.00	46.3	141.77	20,700[b]	1.5
Hong Kong	1.11	6.1	6,516.25	n.a.	n.a.
India	3,287.59	54.7	386.30	17,830	1.4
Indonesia	1,890.75	30.1[a]	132.86	9,770	3.9
Japan	377.84	12.6	336.65	13,280	10.4
Malaysia	330.25	24.0	90.54	1,700	5.7
Myanmar	676.59	19.2	78.04	6,000	11.4
Philippines	300.00	45.0	307.77	1,650	1.8
Singapore	0.72	1.0	7,540.85	n.a.	n.a.
South Korea	99.68	22.0	493.59	10,400	21.1
Sri Lanka	65.61	36.0	312.45	2,300	11.2
Taiwan	36.19	22.3	645.72	2,690	11.5
Thailand	514.00	35.0	126.21	10,000	15.4
Vietnam	310.07	30.4	289.32	7,100	7.9

Note: All data relate to 2013 unless otherwise indicated.

[a] 2011 data.
[b] 2012 data.

Chapter 22

Construction output indicators

CONSTRUCTION OUTPUT

The table below summarises construction output statistics from the country key data sheets. On the key data sheet for each country, an output figure is given in national currency and the year to which it relates is noted.

In this summary table, figures in national currency are listed and, in addition, in order to facilitate (crude) comparisons, US dollar, pound sterling and yen equivalents are presented for each figure. The currency conversions have been carried out using appropriate exchange rates. As noted earlier, construction statistics, including those for construction output, are notoriously unreliable and, in addition, national definitions of construction output vary widely. It would, therefore, be unwise to draw too many conclusions from this table.

		Net value of construction output (in billions)			
Country	*National unit of currency*	*National currency*	*UK£*	*US$*	*Yen*
Brunei	B$	n.a.			
Cambodia	Riels	3,662.50[a]	0.55	0.90	89.77
China	Rmb	3,900.00	391.17	637.25	65,000.00
Hong Kong	HK$	37.90	3.02	4.89	490.93
India	Rs	n.a.			
Indonesia	Rp	370,418.00[b]	19.77	32.01	3,214.04
Japan	¥	n.a.			
Malaysia	RM	29.33	5.64	9.14	916.63
Myanmar	MMK	2,515.90[a]	1.62	2.62	262.62
Philippines	Php	382.80	5.48	8.82	872.98
Singapore	S$	17.20	8.51	13.76	1,376.00
South Korea	Won	162,923.20	94.78	153.41	15,413.74
Sri Lanka	LKR	282.70	1.33	2.16	216.58

Continued

Country	National unit of currency	Net value of construction output (in billions)			
		National currency	UK£	US$	Yen
Taiwan	NT$	377.70[a]	7.90	12.79	1,283.38
Thailand	Bt	282.00[b]	5.47	8.88	908.80
Vietnam	VND	n.a.			

Note: All data relate to 2013 unless otherwise indicated.

[a] 2012.
[b] 2011.

CONSTRUCTION OUTPUT PER CAPITA

This table is based on the previous one, but has each figure for construction output divided by the population of that country. Despite the uncertainty of both construction and population data and the limitations of exchange rates, the table reveals some useful indicators of construction activity. South Korea has the highest by far construction output per capita – 60 times greater than the lowest in the table (Myanmar). Cambodia, Myanmar and Philippines have output per capita of less than US$100. The remainder of the Asia Pacific countries are spread over the range from Sri Lanka (US$105) to South Korea (US$3,118).

Country	National unit of currency	Net value of construction output			
		National currency	UK£	US$	Yen
Brunei	B$	n.a.			
Cambodia	Riels	237,670[a]	35.88	58.08	5,825.25
China	Rmb	2,866	287.42	468.23	47,759.00
Hong Kong	HK$	5,249	418.27	677.33	67,996.21
India	Rs	n.a.			
Indonesia	Rp	1,474,594[b]	78.72	127.42	12,794.74
Japan	¥	n.a.			
Malaysia	RM	981	188.65	305.61	30,656.35
Myanmar	MMK	47,650[a]	30.64	49.58	4,973.86
Philippines	Php	4,146	59.36	95.57	9,454.96
Singapore	S$	3,185	1,576.82	2,548.15	2,54,814.81
South Korea	Won	3,311,447[a]	1,926.38	3,118.12	3,13,287.34
Sri Lanka	LKR	13,790	65.01	105.27	10,564.81
Taiwan	NT$	16,162[a]	338.11	547.11	54,915.89
Thailand	Bt	4,347[b]	84.30	136.88	14,009.53
Vietnam	VND	n.a.			

Note: All data relate to 2013 unless otherwise indicated.

[a] 2012.
[b] 2011.

Chapter 23

Construction cost data

MASON/BRICKLAYER AND UNSKILLED LABOUR COSTS

This table summarises hourly labour costs for a mason/bricklayer and for unskilled labour in each country in the fourth quarter of 2013. The figures in national currency are taken from each country's construction cost data and have been converted into pound sterling, US dollar and yen equivalents using the fourth quarter 2013 exchange rates. As indicated earlier, the cost of labour is the cost to a contractor of employing that employee; it is based not only on the employee's income but also includes allowances for a range of mandatory and voluntary contributions which vary from country to country.

It is probable that the definitions of skilled and unskilled and what is included in labour costs vary between countries, thus these figures should not be taken as strictly comparable. The ranking and relative levels of labour costs are broadly similar to the GDP per capita figures though there are interesting detailed differences in ranking.

	Mason/bricklayer per hour				*Unskilled labour per hour*			
Country	*National currency*	*UK£*	*US$*	*Yen*	*National currency*	*UK£*	*US$*	*Yen*
Brunei	6.00	3.02	4.84	484	3.88	1.95	3.13	313
Cambodia	4,337.52[a]	0.65	1.06	106	n.a.			
China	17.31[a]	1.74	2.83	289	13.85[a]	1.39	2.26	231
Hong Kong	165.00	13.15	21.29	2,137	95.00	7.57	12.26	1,231
India	71.88	0.72	1.16	117	n.a.			
Indonesia	16,250.00	0.87	1.40	141	12,500.00	0.67	1.08	108
Japan	2,737.50[a]	16.49	26.84	–	1,600.00[a]	9.64	15.69	–
Malaysia	13.88[a]	2.67	4.32	434	8.75[a]	1.68	2.73	273
Myanmar	540.56[a]	0.35	0.56	56	n.a.			
Philippines	75.75	1.08	1.75	173	75.75	1.08	1.75	173

Continued

	Mason/bricklayer per hour				*Unskilled labour per hour*			
Country	*National currency*	*UK£*	*US$*	*Yen*	*National currency*	*UK£*	*US$*	*Yen*
Singapore	n.a.				n.a.			
South Korea	15,287.50	8.89	14.40	1,446	10,512.50	6.12	9.90	995
Sri Lanka	225.00	1.06	1.72	172	175.00	0.82	1.34	134
Taiwan	387.50	8.11	13.12	1,317	268.75	5.62	9.10	913
Thailand	68.75[a]	1.33	2.16	222	43.75[a]	0.85	1.38	141
Vietnam	46,217.76	1.35	2.19	220	n.a.			

[a] Wage rate.

SITE MANAGER AND QUALIFIED ARCHITECT LABOUR RATES

This table is from the same source as the previous and is presented in the same way. Site managers and qualified architects are representative of staff rather than site labour.

	Site manager per hour				*Qualified architect per hour*			
Country	*National currency*	*UK£*	*US$*	*Yen*	*National currency*	*UK£*	*US$*	*Yen*
Brunei	35.29	17.73	28.46	2,846	32.35	16.26	26.09	2,609
Cambodia	25,575.00[a]	3.86	6.25	627	n.a.			
China	80.77[a]	8.10	13.20	1,346	72.12[a]	7.23	11.78	1,202
Hong Kong	379.50	30.24	48.97	4,916	314.29	25.04	40.55	4,071
India	750.00	7.50	12.14	1,219	300.00	3.00	4.86	487
Indonesia	n.a.				n.a.			
Japan	5,650.00[a]	34.04	55.39	–	4,787.50[a]	28.84	46.94	–
Malaysia	52.08[a]	10.02	16.22	1,628	36.46[a]	7.01	11.36	1,139
Myanmar	2,469.77[a]	1.59	2.57	258	n.a.			
Philippines	233.38	3.34	5.38	532	218.88	3.13	5.05	499
Singapore	42.12	20.85	33.70	3,370	46.33	22.94	37.06	3,706
South Korea	36,800.00	21.41	34.65	3,482	43,700.00	25.42	41.15	4,134
Sri Lanka	1,250.00	5.89	9.54	958	781.25	3.68	5.96	599
Taiwan	531.82	11.13	18.00	1,807	825.00	17.26	27.93	2,803
Thailand	312.50[a]	6.06	9.84	1,007	216.35[a]	4.20	6.81	697
Vietnam	n.a.				n.a.			

[a] Wage rate.

MATERIAL COSTS: CEMENT AND CONCRETE AGGREGATES

The table below summarises costs per tonne for cement and costs per cubic metre for concrete aggregates in the fourth quarter of 2013. The figures in national currency are taken from each country's construction cost data and converted into pound sterling, US dollar and yen equivalents using the fourth quarter 2013 exchange rates.

Costs are as delivered to the site in a major, usually the capital-city. It is assumed that the materials are in quantities as required for a medium-sized construction project and that the location of the works would be neither constrained nor remote. Material costs generally exclude VAT or other similar taxes.

	Cement (tonne)				*Aggregate for concrete (m^3)*			
Country	*National currency*	*UK£*	*US$*	*Yen*	*National currency*	*UK£*	*US$*	*Yen*
Brunei	203	102.01	163.71	16,371	45	22.61	36.29	3,629
Cambodia	437,844	66.10	107.00	10,731	65,472	9.88	16.00	1,605
China	440	44.13	71.90	7,333	207	20.76	33.82	3,450
Hong Kong	700	55.78	90.32	9,067	96	7.65	12.39	1,244
India	5,800	58.02	93.90	9,423	1,553	15.54	25.14	2,523
Indonesia	1,600,000	85.42	138.25	13,883	320,000	17.08	27.65	2,777
Japan	17,600	106.02	172.55	–	3,850	23.19	37.75	–
Malaysia	362	69.62	112.77	11,313	37	7.12	11.53	1,156
Myanmar	5,795	3.73	6.03	605	51,961	33.42	54.07	5,424
Philippines	5,625	80.53	129.67	12,828	950	13.60	21.90	2,166
Singapore	99	49.01	79.20	7,920	46	22.77	36.80	3,680
South Korea	108,250	62.97	101.93	10,241	19,100	11.11	17.98	1,807
Sri Lanka	16,650	78.49	127.10	12,756	2,900	13.67	22.14	2,222
Taiwan	3,500	73.22	118.48	11,893	700	14.64	23.70	2,379
Thailand	2,600	50.42	81.86	8,379	450	8.73	14.17	1,450
Vietnam	1,582,800	46.31	75.00	7,525	162,290	4.75	7.69	772

MATERIALS COSTS: READY MIXED CONCRETE AND REINFORCEMENT STEEL

The table below summarises costs per cubic metre for ready mixed concrete and costs per tonne for reinforcement steel in the fourth quarter of 2013. The figures in national currency are taken from each country's construction cost data and converted into pound sterling, US dollar and yen equivalents using the fourth quarter 2013 exchange rates.

Costs are as delivered to site in a major – usually the capital – city. It is assumed that the materials are in quantities as required for a medium-sized construction project and that the location of the works would be neither constrained nor remote. Material costs generally exclude VAT or other similar taxes.

	Ready mixed concrete (m^3)				*Mild steel reinforcement (tonne)*			
Country	*National currency*	*UK£*	*US$*	*Yen*	*National currency*	*UK£*	*US$*	*Yen*
Brunei	129	64.82	104.03	10,403	860	432.16	693.55	69,355
Cambodia	306,900	46.33	75.00	7,522	2,925,780	441.69	715.00	71,710
China	n.a.				3,800	381.14	620.92	63,333
Hong Kong	800	63.75	103.23	10,363	6,000	478.09	774.19	77,720
India	4,500	45.02	72.85	7,311	45,500	455.18	736.60	73,924
Indonesia	1,050,000	56.05	90.73	9,111	9,000,000	480.46	777.67	78,091
Japan	12,800	77.11	125.49	–	84,000	506.02	823.53	–
Malaysia	240	46.15	74.77	7,500	3,980	765.38	1,239.88	124,375
Myanmar	93,227	59.95	97.01	9,731	634,058	407.75	659.79	66,186
Philippines	4,800	68.72	110.65	10,946	32,000	458.12	737.67	72,976
Singapore	99	49.01	79.20	7,920	723	357.92	578.40	57,840
South Korea	76,300	44.39	71.85	7,219	782,000	454.92	736.35	73,983
Sri Lanka	13,100	61.75	100.00	10,036	120,000	565.69	916.03	91,933
Taiwan	2,800	58.58	94.79	9,514	19,500	407.95	660.12	66,259
Thailand	2,600	50.42	81.86	8,379	24,500	475.08	771.41	78,956
Vietnam	1,253,367	36.67	59.39	5,959	14,983,840	438.41	710.00	71,240

MATERIALS COSTS: COMMON BRICKS AND HOLLOW CONCRETE BLOCKS

The table below summarises costs per 1000 pieces for bricks and blocks in the fourth quarter of 2013. The figures in national currency are taken from each country's construction cost data and converted into pound sterling, US dollar and yen equivalents using the fourth quarter 2013 exchange rates.

Costs are as delivered to site in a major – usually the capital – city. It is assumed that the materials are in quantities as required for a medium-sized construction project and that the location of the works would be neither constrained nor remote. Material costs generally exclude VAT or other similar taxes.

The costs of bricks and blocks vary by the availability of raw materials and the national practices in walling construction. Where brick-making clays are not readily available, for example, the cost of bricks may be relatively high. It

is probably reasonable to assume that brick dimensions are broadly similar; the dimensions of concrete blocks, however, can and do vary widely.

	Common bricks (1000 pcs)				*Hollow concrete blocks (1000 pcs)*			
Country	*National currency*	*UK£*	*US$*	*Yen*	*National currency*	*UK£*	*US$*	*Yen*
Brunei	180	90.45	145.16	14,516	880	442.21	709.68	70,968
Cambodia	1,350,360	203.86	330.00	33,097	n.a.			
China	n.a.				1,790	179.54	292.48	29,833
Hong Kong	1,700	135.46	219.35	22,021	2,500	199.20	322.58	32,383
India	6,000	60.02	97.13	9,748	32,000	320.13	518.05	51,990
Indonesia	800,000	42.71	69.13	6,941	n.a.			
Japan	205,000	1,234.94	2,009.80	–	250,000	1,506.02	2,450.98	–
Malaysia	340	65.38	105.92	10,625	3,150	605.77	981.31	98,438
Myanmar	79,254	50.97	82.47	8,273	n.a.			
Philippines	11,000	157.48	253.57	25,086	13,000	186.11	299.68	29,647
Singapore	230	113.86	184.00	18,400	650	321.78	520.00	52,000
South Korea	56,250	32.72	52.97	5,322	910,000	529.38	856.87	86,093
Sri Lanka	9,500	44.78	72.52	7,278	52,000	245.13	396.95	39,838
Taiwan	2,400	50.21	81.25	8,155	4,700	98.33	159.11	15,970
Thailand	800	15.51	25.19	2,578	3,000	58.17	94.46	9,668
Vietnam	n.a.				8547,120	250.08	405.00	40,637

MATERIALS COSTS: SOFTWOOD FOR JOINERY AND QUILT INSULATION

The table below summarises costs per cubic metre for softwood for joinery and costs per square metre for 100 mm thick quilt insulation in the fourth quarter of 2013. The figures in national currency are taken from each country's construction cost data and converted into pound sterling, US dollar and yen equivalents using the fourth quarter 2013 exchange rates.

Costs are as delivered to site in a major – usually the capital – city. It is assumed that the materials are in quantities as required for a medium-sized construction project and that the location of the works would be neither constrained nor remote. Material costs generally exclude VAT or other similar taxes.

	Softwood for joinery (m^3)				*Quilt insulation 100 mm (m^2)*			
Country	*National currency*	*UK£*	*US$*	*Yen*	*National currency*	*UK£*	*US$*	*Yen*
Brunei	2,667[a]	1,340.20	2,150.81	215,081	5.46[a]	2.74	4.40	440
Cambodia	2,250,600	339.76	550.00	55,162	n.a.			

Continued

Country	Softwood for joinery (m^3)				Quilt insulation 100 mm (m^2)			
	National currency	UK£	US$	Yen	National currency	UK£	US$	Yen
China	2,000	200.60	326.80	33,333	50	5.02	8.17	833
Hong Kong	4,600	366.53	593.55	59,585	76	6.06	9.81	984
India	n.a.				900	9.00	14.57	1,462
Indonesia	11,000,000	587.23	950.49	95,445	280,000	14.95	24.19	2,430
Japan	130,000	783.13	1,274.51	–	n.a.			
Malaysia	n.a.				n.a.			
Myanmar	n.a.				n.a.			
Philippines	40,000	572.66	922.08	91,220	317	4.54	7.31	723
Singapore	667	330.20	533.60	53,360	7	3.47	5.60	560
South Korea	1,467,000	853.40	1,381.36	1,38,789	10,370	6.03	9.76	981
Sri Lanka	n.a.				n.a.			
Taiwan	n.a.				11,250	235.36	380.84	38,226
Thailand	30,000	581.73	944.58	96,681	n.a.			
Vietnam	14,069,404	411.65	666.67	66,892	84,416	2.47	4.00	401

[a] 4Q12.

MATERIALS COSTS: SHEET/FLOAT GLASS AND PLASTER AND PAINT TO PLASTERBOARD

The table below summarises costs per square metre for sheet or float glass and costs per square metre for plaster and paint to a 9–12 mm thick plasterboard in the fourth quarter of 2013. The figures in national currency are taken from each country's construction cost data and converted into pound sterling, US dollar and yen equivalents using the fourth quarter 2013 exchange rates.

Costs are as delivered to site in a major – usually the capital – city. It is assumed that the materials are in quantities as required for a medium-sized construction project and that the location of the works would be neither constrained nor remote. Material costs generally exclude VAT or other similar taxes.

Country	Sheet/float glass 6 mm (m^2)				Plasterboard 9–12 mm (m^2)			
	National currency	UK£	US$	Yen	National currency	UK£	US$	Yen
Brunei	60	30.15	48.39	4,839	24.50	12.31	19.76	1,976
Cambodia	61,380	9.27	15.00	1,504	n.a.			
China	30[a]	3.01	4.90	500	20	2.01	3.27	333
Hong Kong	150	11.95	19.35	1,943	150	11.95	19.35	1,943
India	700[b]	7.00	11.33	1,137	250[c]	2.50	4.05	406
Indonesia	190,000[d]	10.14	16.42	1,649	34,722	1.85	3.00	301

Country	Sheet/float glass 6 mm (m^2)				Plasterboard 9–12 mm (m^2)			
	National currency	UK£	US$	Yen	National currency	UK£	US$	Yen
Japan	1,200[e]	7.23	11.76	–	164	0.99	1.61	–
Malaysia	47.40[e]	9.12	14.77	1,481	30[f]	5.77	9.35	938
Myanmar	12,282	7.90	12.78	1,282	14,165[c]	9.11	14.74	1,479
Philippines	1,022	14.63	23.56	2,331	348[c]	4.98	8.02	794
Singapore	30[b]	14.85	24.00	2,400	3	1.49	2.40	240
South Korea	n.a.				1,870	1.09	1.76	177
Sri Lanka	600[g]	2.83	4.58	460	n.a.			
Taiwan	n.a.				150	3.14	5.08	510
Thailand	900	17.45	28.34	2,900	120	2.33	3.78	387
Vietnam	181,494	5.31	8.60	863	78,085[h]	2.28	3.70	371

[a] 4 mm.
[b] 10 mm.
[c] 13 mm.
[d] 8 mm.
[e] 5 mm.
[f] 15 mm.
[g] 3 mm.
[h] 12.7 mm.

MATERIALS COSTS: EMULSION PAINT AND VINYL FLOOR TILES

The table below summarises costs per litre for emulsion paint and costs per square metre for vinyl floor tiles in the fourth quarter of 2013. The figures in national currency are taken from each country's construction cost data and converted into pound sterling, US dollar and yen equivalents using the fourth quarter 2013 exchange rates.

Costs are as delivered to site in a major – usually the capital – city. It is assumed that the materials are in quantities as required for a medium-sized construction project and that the location of the works would be neither constrained nor remote. Material costs generally exclude VAT or other similar taxes.

Country	Emulsion paint (L)				Vinyl floor tiles (m^2)			
	National currency	UK£	US$	Yen	National currency	UK£	US$	Yen
Brunei	3	1.51	2.42	242	28[a]	14.07	22.58	2,258
Cambodia	n.a.				n.a.			
China	20[b]	2.01	3.27	333	60	6.02	9.80	1,000

Continued

	Emulsion paint (L)				*Vinyl floor tiles (m^2)*			
Country	*National currency*	*UK£*	*US$*	*Yen*	*National currency*	*UK£*	*US$*	*Yen*
Hong Kong	52	4.14	6.71	674	100	7.97	12.90	1,295
India	170	1.70	2.75	276	450	4.50	7.29	731
Indonesia	45,000[b]	2.40	3.89	390	200,000[c]	10.68	17.28	1,735
Japan	325[b]	1.96	3.19	–	810	4.88	7.94	–
Malaysia	20.65	3.97	6.43	645	35	6.73	10.90	1,094
Myanmar	38,940[d]	25.04	40.52	4,065	19,355	12.45	20.14	2,020
Philippines	545[d]	7.80	12.56	1,243	441	6.31	10.17	1,006
Singapore	6	2.97	4.80	480	20	9.90	16.00	1,600
South Korea	9,930	5.78	9.35	939	5,400	3.14	5.08	511
Sri Lanka	690	3.25	5.27	529	n.a.			
Taiwan	300	6.28	10.16	1,019	450	9.41	15.23	1,529
Thailand	550[d]	10.67	17.32	1,772	450	8.73	14.17	1,450
Vietnam	75,974	2.22	3.60	361	179,384	5.25	8.50	853

[a] 4Q12.
[b] Kilogram.
[c] Vinyl sheet.
[d] Gallon.

APPROXIMATE ESTIMATING: FACTORIES AND WAREHOUSES

This table summarises approximate estimating costs per square metre for factories and warehouses. Approximate estimating costs are averages as incurred by building clients for typical buildings in major – usually capital – cities in the fourth quarter of 2013. They are based upon the total floor area of all storeys, measured between external walls and without deduction for internal walls. Approximate estimating costs generally include mechanical and electrical installations but exclude furniture, loose or special equipment and external works; they also exclude fees for professional services where a range of costs has been given, the midpoint is shown. The figures in national currency are taken from each country's construction cost data and converted into pound sterling, US dollar and yen equivalents using the fourth quarter 2013 exchange rates.

It must be borne in mind that even where costs are given under the same description in one or more countries, this is not to say that they are identical, or even physically similar. Approximate estimating costs for a particular country are for the normal standards prevailing in that country. Quality and technical standards vary widely and there are differences between countries in what is, and is not, included. The table, therefore, should be used with care.

Country	*Factories for owner occupation (light industrial use) (m^2)*				*Warehouse, low bay (6–8 m high) for letting (no heating) (m^2)*			
	National currency	*UK£*	*US$*	*Yen*	*National currency*	*UK£*	*US$*	*Yen*
Brunei	735	369.35	592.74	59,274	725	364.32	584.68	58,468
Cambodia	n.a.				n.a.			
China	3,700	371.11	604.58	61,667	n.a.			
Hong Kong	19,500	1,553.78	2,516.13	252,591	16,500	1,314.74	2,129.03	213,731
India	18,840	188.48	305.00	30,609	13,730	137.35	222.28	22,307
Indonesia	3,876,955	206.97	335.00	33,640	3,124,710	166.81	270.00	27,112
Japan	173,000	1,042.17	1,696.08	–	117,000	704.82	1,147.06	–
Malaysia	1,580	303.85	492.21	49,375	n.a.			
Myanmar	n.a.				n.a.			
Philippines	20,580	294.63	474.41	46,933	15,500	221.90	357.31	35,348
Singapore	n.a.				1,350	668.32	1,080.00	108,000
South Korea	780,000	453.75	734.46	73,794	610,000	354.86	574.39	57,711
Sri Lanka	35,500	167.35	270.99	27,197	n.a.			
Taiwan	27,200	569.04	920.79	92,423	n.a.			
Thailand	18,250	353.89	574.62	58,814	n.a.			
Vietnam	6,141,264	179.68	291.00	29,198	5,930,224	173.51	281.00	28,195

APPROXIMATE ESTIMATING: OFFICES

This table summarises approximate estimating costs per square metre for two different types of office buildings. Approximate estimating costs are averages as incurred by building clients for typical buildings in major – usually capital – cities in the fourth quarter of 2013. They are based upon the total floor area of all storeys, measured between external walls and without deduction for internal walls. Approximate estimating costs generally include mechanical and electrical installations but exclude furniture, loose or special equipment and external works; they also exclude fees for professional services. Where a range of costs has been given, the midpoint is shown. The figures in national currency are taken from each country's construction cost data and converted into pound sterling, US dollar and yen equivalents using the fourth quarter 2013 exchange rates.

It must be borne in mind that even where costs are given under the same description in one or more countries, this is not to say that they are identical, or even physically similar. Approximate estimating costs for a particular country are for the normal standards prevailing in that country. Quality and technical standards vary widely and there are differences between countries in what is, and is not, included. The table, therefore, should be used with care.

Country	*Offices for letting, 5–10 storeys air-conditioned (m^2)*				*Prestige/headquarters office high-rise air-conditioned (m^2)*			
	National currency	*UK£*	*US$*	*Yen*	*National currency*	*UK£*	*US$*	*Yen*
Brunei	1,223	614.57	986.29	98,629	n.a.			
Cambodia	n.a.				2,762,100	416.98	675.00	67,699
China	6,500	651.96	1,062.09	108,333	10,000	1,003.01	1,633.99	166,667
Hong Kong	22,700	1,808.76	2,929.03	294,041	31,400	2,501.99	4,051.61	406,736
India	24,600	246.10	398.25	39,968	30,250	302.62	489.72	49,147
Indonesia	6,365,150	339.80	550.00	55,229	11,573,000	617.82	1,000.00	100,416
Japan	258,000	1,554.22	2,529.41	–	406,000	2,445.78	3,980.39	–
Malaysia	2,000	384.62	623.05	62,500	3,950	759.62	1,230.53	123,438
Myanmar	n.a.				1,441,500	927.01	1,500.00	150,470
Philippines	30,100	430.92	693.87	68,643	52,000	744.45	1,198.71	118,586
Singapore	2,500	1,237.62	2,000.00	200,000	3,050	1,509.90	2,440.00	244,000
South Korea	1,250,000	727.17	1,177.02	118,259	1,650,000	959.86	1,553.67	156,102
Sri Lanka	n.a.				185,000	872.11	1,412.21	141,730
Taiwan	36,300	759.41	1,228.84	123,344	54,450	1,139.12	1,843.26	185,015
Thailand	23,500	455.69	739.92	75,733	32,000	620.52	1,007.56	103,126
Vietnam	13,780,912	403.21	653.00	65,520	21,420,560	626.74	1,015.00	101,843

APPROXIMATE ESTIMATING: HOUSING

This table summarises approximate estimating costs per square metre for two different types of housing. In countries where housing types did not match exactly these descriptions, the nearest equivalent has been taken.

Approximate estimating costs are averages as incurred by building clients for typical buildings in major – usually capital – cities in the fourth quarter of 2013. They are based upon the total floor area of all storeys, measured between external walls and without deduction for internal walls. Approximate estimating costs generally include mechanical and electrical installations but exclude furniture, loose or special equipment and external works; they also exclude fees for professional services. Where a range of costs has been given, the mid-point is shown. The figures in national currency are taken from each country's construction cost data and converted into pound sterling, US dollar and yen equivalents using the fourth quarter 2013 exchange rates.

It must be borne in mind that even where costs are given under the same description in one or more countries, this is not to say that they are identical, or even physically similar. Approximate estimating costs for a particular country are for the normal standards prevailing in that country. Quality and technical standards vary widely and there are differences between countries in what is, and is not, included. The table, therefore, should be used with care.

Country	*Private mass market single family housing detached/semi detached (m^2)*				*Private sector apartment building (standard specification) (m^2)*			
	National currency	*UK£*	*US$*	*Yen*	*National currency*	*UK£*	*US$*	*Yen*
Brunei	675	339.20	544.35	54,435	980	492.46	790.32	79,032
Cambodia	n.a.				1,964,160	296.52	480.00	48,141
China	4,500	451.35	735.29	75,000	5,000	501.50	816.99	83,333
Hong Kong	33,400	2,661.35	4,309.68	432,642	24,600	1,960.16	3,174.19	318,653
India	17,990	179.97	291.24	29,228	20,990	209.98	339.81	34,102
Indonesia	n.a.				9,837,050	525.15	850.00	85,354
Japan	228,000	1,373.49	2,235.29	–	293,000	1,765.06	2,872.55	–
Malaysia	2,550	490.38	794.39	79,688	1,750	336.54	545.17	54,688
Myanmar	n.a.				864,900	556.21	900.00	90,282
Philippines	22,000	314.96	507.15	50,171	38,200	546.89	880.59	87,115
Singapore	3,150	1,559.41	2,520.00	252,000	2,950	1,460.40	2,360.00	236,000
South Korea	1,350,000	785.34	1,271.19	127,720	1,500,000	872.60	1,412.43	141,911
Sri Lanka	44,500	209.78	339.69	34,092	82,500	388.91	629.77	63,204
Taiwan	n.a.				36,300	759.41	1,228.84	123,344
Thailand	27,500	533.26	865.87	88,624	25,000	484.78	787.15	80,567
Vietnam	n.a.				13,569,872	379.04	643.00	64,517

APPROXIMATE ESTIMATING: HOSPITALS AND SCHOOLS

This table summarises approximate estimating costs per square metre for general hospitals and secondary or middle schools. Approximate estimating costs are averages as incurred by building clients for typical buildings in major – usually capital – cities in the fourth quarter of 2013. They are based upon the total floor area of all storeys, measured between external walls and without deduction for internal walls. Approximate estimating costs generally include mechanical and electrical installations but exclude furniture, loose or special equipment and external works; they also exclude fees for professional services. Where a range of costs has been given, the midpoint is shown. The figures in national currency are taken from each country's construction cost data and converted into pound sterling, US dollar and yen equivalents using the fourth quarter 2013 exchange rates.

It must be borne in mind that even where costs are given under the same description in one or more countries, this is not to say that they are identical, or even physically similar. Approximate estimating costs for a particular country are for the normal standards prevailing in that country. Quality and technical standards vary widely and there are differences between countries in what is, and is not, included. The table, therefore, should be used with care.

	General hospitals (m^2)				*Secondary/middle schools (m^2)*			
Country	*National currency*	*UK£*	*US$*	*Yen*	*National currency*	*UK£*	*US$*	*Yen*
Brunei	2,000	1,005.03	1,612.90	161,290	1,150	577.89	927.42	92,742
Cambodia	n.a.				n.a.			
China	10,000	1,003.01	1,633.99	166,667	4,400	441.32	718.95	73,333
Hong Kong	40,200	3,203.19	5,187.10	520,725	20,300	1,617.53	2,619.35	262,953
India	36,220	362.34	586.37	58,846	15,750	157.56	254.98	25,589
Indonesia	9,837,050	525.15	850.00	85,354	6,943,800	370.69	600.00	60,250
Japan	445,000	2,680.72	4,362.75	–	297,000	1,789.16	2,911.76	–
Malaysia	n.a.				1,220	234.62	380.06	38,125
Myanmar	n.a.				n.a.			
Philippines	49,000	701.50	1,129.55	111,745	n.a.			
Singapore	3,950	1,955.45	3,160.00	316,000	n.a.			
South Korea	1,800,000	1,047.12	1,694.92	170,293	1,200,000	698.08	1,129.94	113,529
Sri Lanka	66,500	313.49	507.63	50,946	n.a.			
Taiwan	75,625	1,582.11	2,560.09	256,966	36,300	759.41	1,228.84	123,344
Thailand	42,500	824.12	1,338.16	136,964	22,500	436.30	708.44	72,510
Vietnam	n.a.				n.a.			

APPROXIMATE ESTIMATING: THEATRES AND SPORTS HALLS

This table summarises approximate estimating costs per square metre for theatres and sports halls. Approximate estimating costs are averages as incurred by building clients for typical buildings in major – usually capital – cities in the fourth quarter of 2013. They are based upon the total floor area of all storeys, measured between external walls and without deduction for internal walls. Approximate estimating costs generally include mechanical and electrical installations but exclude furniture, loose or special equipment and external works; they also exclude fees for professional services. Where a range of costs has been given, the midpoint is shown. The figures in national currency are taken from each country's construction cost data and converted into pound sterling, US dollar and yen equivalents using the fourth quarter 2013 exchange rates.

It must be borne in mind that even where costs are given under the same description in one or more countries, this is not to say that they are identical, or even physically similar. Approximate estimating costs for a particular country are for the normal standards prevailing in that country. Quality and technical standards vary widely and there are differences between countries in what is, and is not, included. The table, therefore, should be used with care.

Country	*Theatres including seating and stage equipment, over 500 seats (m^2)*				*Sports halls including changing and social facilities (m^2)*			
	National currency	*UK£*	*US$*	*Yen*	*National currency*	*UK£*	*US$*	*Yen*
Brunei	3,500	1,758.79	2,822.58	282,258	1,700	854.27	1,370.97	137,097
Cambodia	n.a.				n.a.			
China	12,500	1,253.76	2,042.48	208,333	n.a.			
Hong Kong	40,000	3,187.25	5,161.29	518,135	n.a.			
India	n.a.				16,690	166.97	270.20	27,116
Indonesia	n.a.				n.a.			
Japan	480,000	2,891.57	4,705.88	–	246,000	1,481.93	2,411.76	–
Malaysia	n.a.				1,970	378.85	613.71	61,563
Myanmar	n.a.				n.a.			
Philippines	62,100	889.05	1,431.54	141,619	48,700	697.21	1,122.64	111,060
Singapore	n.a.				3,050	1,509.90	2,440.00	244,000
South Korea	2,600,000	1,512.51	2,448.21	245,979	2,000,000	1,163.47	1,883.24	189,215
Sri Lanka	n.a.				n.a.			
Taiwan	56,332	1,178.49	1,906.97	191,410	n.a.			
Thailand	65,000	1,260.42	2,046.60	209,475	50,000	969.56	1,574.31	161,134
Vietnam	n.a.				n.a.			

APPROXIMATE ESTIMATING: HOTELS

This table summarises approximate estimating costs per square metre for two types of hotels. Approximate estimating costs are averages as incurred by building clients for typical buildings in major – usually capital – cities in the fourth quarter of 2013. They are based upon the total floor area of all storeys, measured between external walls and without deduction for internal walls. Approximate estimating costs generally include FF&E and mechanical and electrical installations but exclude hotel operating equipment or special equipment and external works; they also exclude fees for professional services. Where a range of costs has been given, the midpoint is shown. The figures in national currency are taken from each country's construction cost data and converted into pound sterling, US dollar and yen equivalents using the fourth quarter 2013 exchange rates.

It must be borne in mind that even where costs are given under the same description in one or more countries, this is not to say that they are identical, or even physically similar. Approximate estimating costs for a particular country are for the normal standards prevailing in that country. Quality and technical standards vary widely and there are differences between countries in what is, and is not, included. The table, therefore, should be used with care.

	Hotel, 5 star, city centre (m^2)				*Hotel, 3 star, city/provincial (m^2)*			
Country	*National currency*	*UK£*	*US$*	*Yen*	*National currency*	*UK£*	*US$*	*Yen*
Brunei	2,450	1,231.16	1,975.81	197,581	1,850	929.65	1,491.94	149,194
Cambodia	5,892,480	889.57	1,440.00	144,424	4,317,060	651.73	1,055.00	105,810
China	15,000	1,504.51	2,450.98	250,000	8,000	802.41	1,307.19	133,333
Hong Kong	33,200	2,645.42	4,283.87	430,052	30,200	2,406.37	3,896.77	391,192
India	66,150	661.76	1,070.91	107,474	46,830	468.49	758.14	76,084
Indonesia	19,674,100[a]	1,050.29	1,700.00	170,708	17,359,500[a]	926.73	1,500.00	150,625
Japan	640,000	3,855.42	6,274.51	–	421,000	2,536.14	4,127.45	–
Malaysia	8,090	1,555.77	2,520.25	252,813	5,800	1,115.38	1,806.85	181,250
Myanmar	2,138,225	1,375.06	2,225.00	223,197	n.a.			
Philippines	69,000	987.83	1,590.59	157,355	54,600	781.68	1,258.64	124,515
Singapore	4,500	2,227.72	3,600.00	360,000	3,350	1,658.42	2,680.00	268,000
South Korea	2,700,000	1,570.68	2,542.37	255,440	2,000,000	1,163.47	1,883.24	189,215
Sri Lanka	196,000	923.96	1,496.18	150,157	165,000	777.82	1,259.54	126,408
Taiwan	65,800	1,376.57	2,227.49	223,581	n.a.			
Thailand	58,000	1,124.68	1,826.20	186,916	40,000	775.64	1,259.45	128,908
Vietnam	36,932,000	1,080.58	1,750.00	175,591	30,959,568	905.83	1,467.00	147,195

[a] Exclude FF&E.

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