TALL BUILDINGS

RLB 利比 Rider Levett Bucknall

Rider Levett Bucknall is an independent, global property and construction practice with over 3,600 people in more than 120 offices across Asia, Africa, the Americas, Europe, Middle East and Oceania.

Services provided include Cost Management and Quantity Surveying, Project Management and Advisory Services.

Cover: Shanghai Tower, China

CONTENT

OVERVIEW

Rider Levett Bucknall has been involved in the construction of many of the world's landmark tall buildings which sit on the skyline of some of our major cities, such as Two International Finance Centre, Hong Kong's most iconic office building; Shanghai Tower, China's tallest skyscraper and the world's second tallest building; Pertamina Energy Tower in Jakarta Indonesia; Elite Residence Tower in Dubai UAE; Eureka Tower in Melbourne Australia; Q1 Tower in Gold Coast Australia; and One the Elephant and The Stage in London UK.

Tall building projects are growing in size and number, particularly in China, including Hong Kong, and the Middle East, as well as some parts of North America and Australia. While the development of tall buildings was historically a solution to the lack of space in overcrowded cities such as Hong Kong, it is clear that architecturally distinctive tall buildings are increasingly built as an iconic landmark to represent the success of a certain nation, city, culture, company or individual.

What is Tall Building?

There is no official definition or height above which a building may be classified as a tall building. It could be a tall, continuously habitable building of many storeys, usually designed for office and commercial use, and residential use in densely populated cities such as Hong Kong.

A tall building is not just about height, but also about the urban situation in which it exists. In some cities, most of the tall buildings are located in the Central Business District (CBD), which is a place for condensing renowned product brands / finance & securities / commercial bank representative offices.

Why City Planners and Developers want more Tall Buildings?

- Only a small amount of land area needed in exchange for a large amount of floor space and real estate values
- To build iconic landmarks for the city
- Sustainability and energy efficiency

Rider Levett Bucknall undertook the initial estimating and cost planning role or offered full quantity surveying services on many tall building projects around the world. We subsequently monitored the construction cost of the projects and predicted the cash-flow to finance the projects. Value engineering at various stages of the projects' design and planning stages was carried out in order to generate a design which met the clients' needs in terms of functional requirements, quality, environmental standards, timing and cost.

COST COMMENTARY

In most cities, most of the tall buildings are located in the Central Business District (CBD), offering Grade A / premium quality office space.

The availability of development site area is limited and the footprint of a building almost occupies 80% to 100% of the site area. However, with the design of central cores for most of the tall buildings, the lettable area can be as high as 80%. According to the efficiency of a building due to tall design, we can focus on and discuss various issues.

Foundations & Structure

For buildings founded on bedrock with end-bearing piles, the taller they are, the lower the per square metre foundation costs will be. However, the overturning moment of the buildings due to their height and the wind load imposed on the top sections of the buildings may drive up the foundation costs. Another cost consideration is the methodology or construction sequence, like top down construction of the foundation and basement which is carried out concurrently with the super high structure to save overall construction time.

Structure

The design of the structure which has to overcome heavy wind loads plays a very significant role in fulfilling the designer's aspiration of a tall building. Usually the structure is designed as a combination of basic structural systems such as reinforced concrete core wall, structural steel frame, prestressed works and trusses. Such a combination invariably results in higher structural costs. The physical constraints in building the structure also contribute to the high cost of the structure.

Façade

Not only the structure has to be capable of resisting wind loads, the façade system and its fixing accessories should also have to withstand wind impact. In addition, the cost of window cleaning system is higher than the norm as the system has to be tailor-made to overcome wind speed with the assistance of cast-in accessories.

Architectural Works, Finishes & Fitting-Out to Public Areas

Although these elements are area related rather than building height related, the overall area unit cost is generally marginally higher than that of typical office buildings since internal finishes of tall buildings are generally at the uppermost end of the cost range to project the prestigious image of tall buildings.

Lift Provision

The cost of lifts in tall building is much higher than other standard buildings due to the fact that there are more lifts and the lifts are high speed. Some tall buildings are designed to have multizone lift systems with several number of lifts in each zone while others adopt the double-decker option. In a majority of cases, a shuttle lift system is adopted, taking the passengers to the mid or upper zone for transfer to the top zone.

Building Services

In most of the cases, the building services systems of tall buildings are divided into separate zones, each with its own plant located on intermediate plant floors. With this arrangement, extra number of pumps and major plant are required for acting as transfer and for distributing services within such zone, resulting in higher costs.

COST AREA AND STATISTICS

Over the years, we have assembled a large data library of tall building area and cost statistics. This information has proven to be very useful in performing our cost consultancy and quantity surveying, project management and advisory services for tall buildings.

All costs at 4th Quarter 2016 prices

Region	**Asia**							
Tall Building	A	B	C	D	E	F	G	H
Location	Hong Kong	Hong Kong	Hong Kong	Hong Kong	Hong Kong	PRC	PRC	PRC
Type	Office	Office	Office	Office	Office	Mixed	Mixed	Mixed
Storeys	88	70	63	78	70	112	128	118
Overall Building Height (m)	420	370	280	370	310	530	630	590
Construction Type	Composite	Composite	Composite	Concrete	Composite	Composite	Composite	Composite
Areas	m^2	m^2	m^2	m^2	m^2	m^2	m^2	m^2
Construction Floor Area (CFA)	235,000	113,000	130,000	150,000	170,000	510,000	410,000	477,000
Building Costs								
Cost Per m^2 CFA	US$	US$	US$	US$	US$	US$	US$	US$
Foundation & Substructure	148	178	250	183	155	167	355	109
Structure	839	896	815	611	682	518	777	1012
Façade	415	553	519	405	398	169	322	293
Architectural Works and Finishes	758	1080	812	608	684	857	362	278
Services	839	1050	989	776	830	412	687	515
Lifts and Escalators	165	298	173	153	304	114	134	205
Preliminaries	332	299	389	362	462	137	204	159
Total (in US$/$m^2$ CFA)	3,496	4,354	3,947	3,098	3,515	2,374	2,841	2,571

Note:
The above costs exclude demolition, site investigation, basement construction, tenant fit-out, external works and landscaping, management fee, design fees and reimbursable, VAT, GST, taxes, etc.

COST MODEL

The development is for the construction of a 61-storey tower in Hong Kong comprising 55-storey of office areas, 2-storey entrance foyer lobbies, 2-storey M&E floors and 2-storey refuge floors on a single level basement for carpark and associated external works within site boundary. The site area is about 12,000 m^2. Total Constriction Floor Area is about 150,000 m^2.

Section	Total Cost US$ Million	Cost/m^2 CFA US$
1. Foundation and Basement Construction Contract	41.00	273
2. Main Contract (all R.C. Construction)		
2.1 Main Contractor's Works		
2.1.1 Substructure	1.00	
2.1.2 Structural Frame and Slab	69.00	
2.1.3 Architectural and Builder's Works	49.00	
2.2 Architectural Sub-Contracts	120.00	
2.3 Building Services Sub-Contracts	127.00	
2.4 Preliminaries	43.00	
Sub-total for (2)	409.00	2,727
Total Construction Cost (1) and (2)	450.00	3,000

(all costs at 4th Quarter 2016 prices)

COMPANY EXPERIENCE

Rider Levett Bucknall's current and past project experience speaks for itself in terms of the diversity of projects, both type and location. Examples of projects in which we have been involved, include the following :

Hong Kong and China

WUHAN CHOW TAI FOOK FINANCE CENTRE

WUHAN, CHINA

648 metres
Client : Chow Tai Fook Land (Wuhan) Ltd.

COMPANY EXPERIENCE

Hong Kong and China

SHANGHAI TOWER

SHANGHAI, CHINA

632 metres
Client : Shanghai Tower Construction and Development

TIANJIN CHOW TAI FOOK FINANCE CENTRE

TIANJIN, CHINA

530 metres
Client : Chow Tai Fook Group

COMPANY EXPERIENCE

Hong Kong and China

TWO INTERNATIONAL FINANCE CENTRE

HONG KONG

412 metres
Client : IFC Development

GUANGZHOU CHOW TAI FOOK FINANCE CENTRE

GUANGZHOU, CHINA

530 metres
Client : Chow Tai Fook Group

COMPANY EXPERIENCE

Hong Kong and China

NANNING CHINA RESOURCES TOWER

NANNING, CHINA

445 metres
Client : China Resources Land (Nanning)

PING AN FINANCE CENTRE

SHENZHEN, CHINA

599 metres
Client : Ping An Group

COMPANY EXPERIENCE

Hong Kong and China

ONE ISLAND EAST

HONG KONG

300 metres
Client : Swire Properties Ltd.

GRAND GATEWAY 66

SHANGHAI, CHINA

262 metres
Client : Hang Lung Properties

COMPANY EXPERIENCE

Hong Kong and China

SHUN HING SQUARE

SHENZHEN, CHINA

384 metres
Client : Kumagai Gumi Company

CENTRAL PLAZA

HONG KONG

374 metres
Client : Ryoden Development, Sino Land, Sun Hung Kai Properties

CITIC RUIBO TOWER 1 AND 2

SHANGHAI, CHINA

256 metres (Tower 1)
Client : CITIC Pacific Properties

COMPANY EXPERIENCE

Hong Kong and China

HSBC MAIN BUILDING

HONG KONG

178.8 metres

Client : The Hongkong and Shanghai Banking Corporation

RAFFLES CITY

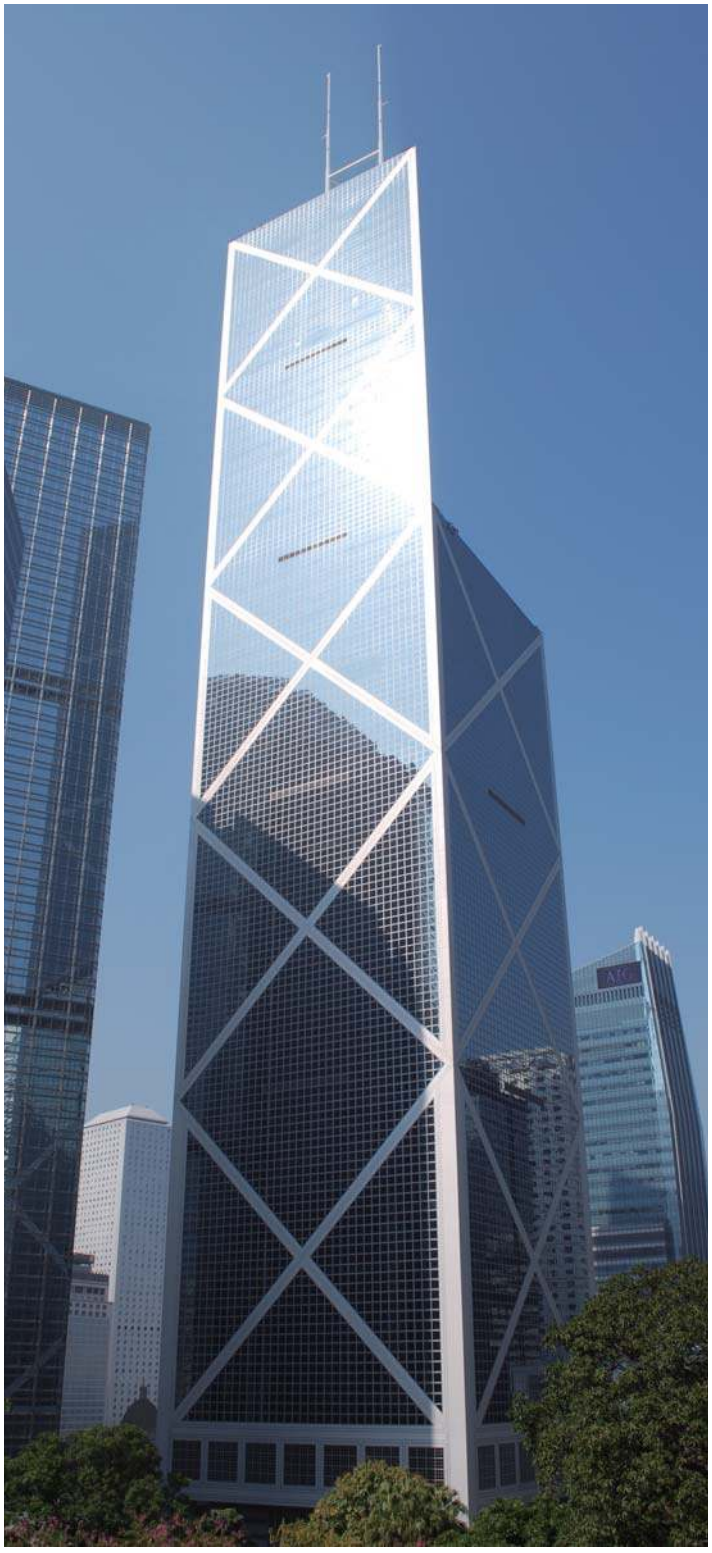
CHONGQING, CHINA

354.5 metres

Client : CapitaLand Limited

COMPANY EXPERIENCE

Hong Kong and China



BANK OF CHINA TOWER

HONG KONG

367.4 metres
Client : Bank of China (Hong Kong)

TIANJIN INTERNATIONAL TRADE TOWER 1

TIANJIN, CHINA

235 metres
Client : CapitaLand Limited

COMPANY EXPERIENCE

Hong Kong and China

ETON CENTRE NORTH TOWER

XIAMEN, CHINA

210 metres
Client : Eton Properties Group

CHEUNG KONG CENTRE

HONG KONG

282.8 metres
Client : Cheung Kong Holdings

KINGTOWN INTERNATIONAL CENTRE

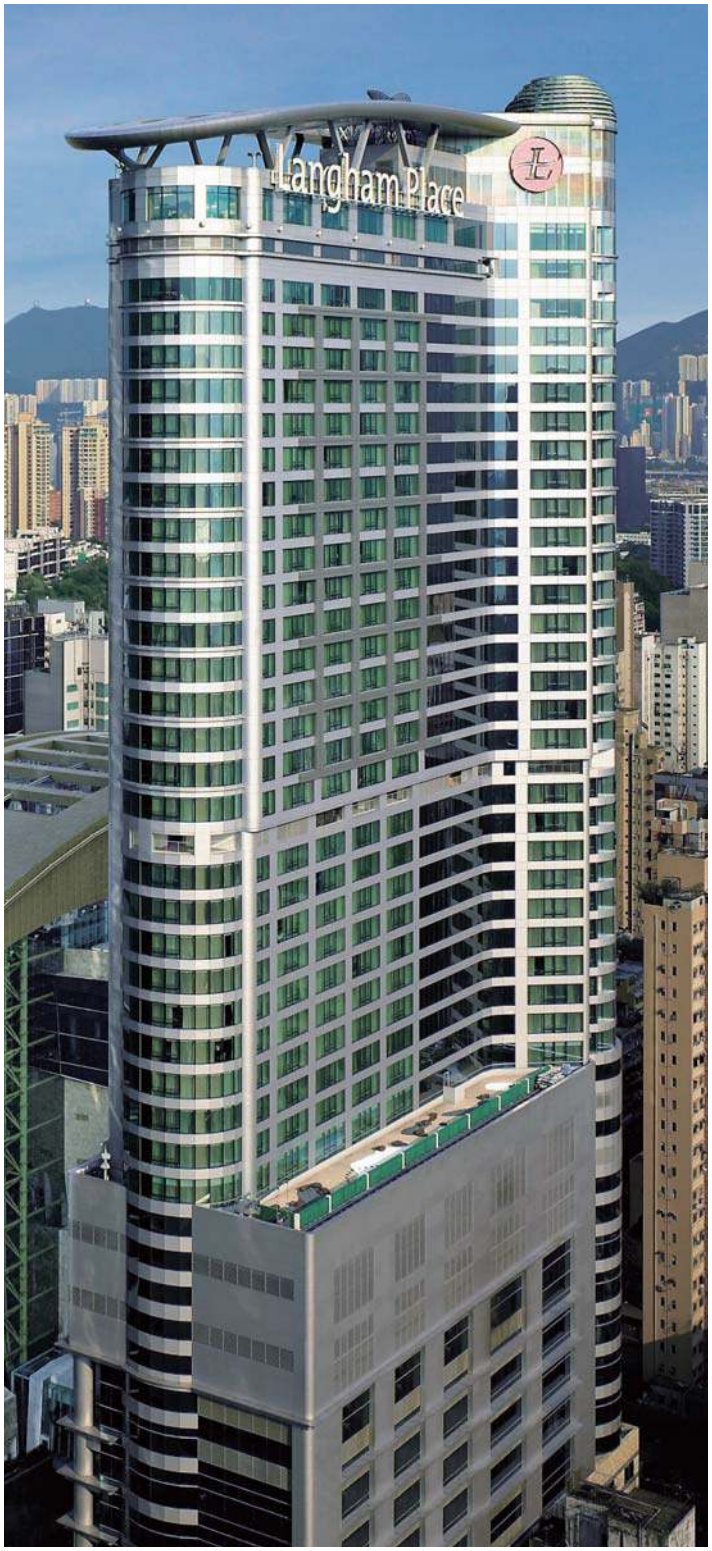
(FORMERLY JINAO TOWER)

NANJING, CHINA

231.2 metres
Client : Nanjing Jin Gao Real Estate Development Ltd.

COMPANY EXPERIENCE

Hong Kong and China



LANGHAM PLACE

HONG KONG

255 metres (Office Tower)
Client : Great Eagle Group / Urban Renewal Authority

YUEXIU FINANCIAL TOWER

GUANGZHOU, CHINA

309.4 metres
Client : Yuexiu Property Company Limited

ETON PLACE DALIAN

DALIAN, CHINA

383 metres (Tower 1)
Client : Eton Properties

COMPANY EXPERIENCE

Hong Kong and China

SK GROUP TOWER

SHANGHAI, CHINA

270 metres

Client : Shanghai Sky Real Estate Development Ltd.

CENTRE 66 OFFICE TOWER 1

WUXI, CHINA

250 metres

Client : Hang Lung Properties

GUANGDONG TELECOM PLAZA

GUANGZHOU, CHINA

260 metres

Client : Guangzhou Telecom

COMPANY EXPERIENCE

Hong Kong and China

THE MASTERPIECE

HONG KONG

257 metres
Client : New World Development

SHENZHEN STOCK EXCHANGE

SHENZHEN, CHINA

245.8 metres
Client : Shenzhen Stock Exchange

COMPANY EXPERIENCE

Asia

PERTAMINA ENERGY TOWER

JAKARTA, INDONESIA

523 metres
Client : PT Pertamina (Persero)

COMPANY EXPERIENCE

Asia

LOTTE WORLD TOWER

SEOUL, KOREA

555 metres
Client : Lotte Group

MARINA BAY SANDS

SINGAPORE

206.9 metres
Client : Marina Bay Sands Pte. Ltd.

COMPANY EXPERIENCE

Asia

FRASERS TOWER

SINGAPORE

235 metres
Client : Frasers Centrepoint Ltd.

REPUBLIC PLAZA

SINGAPORE

276.3 metres
Client : CDL Properties Pte. Ltd.

COMPANY EXPERIENCE

Asia

CHEVRON HOUSE

SINGAPORE

152 metres

Client : Savu Properties Pte. Ltd. / Savu Investments Pte. Ltd.

UOB PLAZA

SINGAPORE

280 metres (Plaza One)

Client : United Overseas Bank Pte. Ltd.

16 COLLYER QUAY

SINGAPORE

179 metres

Client : Savu Properties Pte. Ltd. / Savu Investments Pte. Ltd.

THE CONCOURSE

SINGAPORE

175 metres

Client : Hong Fok Land Pte. Ltd.

COMPANY EXPERIENCE

Middle East

NAKHEEL HARBOUR AND TOWER

DUBAI, UAE

Client : Nakheel Properties

COMPANY EXPERIENCE

Middle East

NAKHEEL MALL & HOTEL

DUBAI, UAE

Client : Nakheel Properties

THE ADDRESS RESIDENCE FOUNTAIN VIEWS

DUBAI, UAE

60-storey
Client : Emaar Properties PJSC

COMPANY EXPERIENCE

Middle East

BOULEVARD POINT

DUBAI, UAE

63-storey
Client : Emaar Properties PJSC

BLVD CRESCENT

DUBAI, UAE

39-storey and 21-storey
Client : Emaar Properties PJSC

COMPANY EXPERIENCE

Middle East

GEMSTONE BUSINESS BAY TOWER

DUBAI, UAE

65-storey
Client : Gemstone Real Estate

ELITE TOWER

DUBAI, UAE

91-storey
Client : Tameer Holding Investment

COMPANY EXPERIENCE

Oceania

EUREKA TOWER

MELBOURNE, AUSTRALIA

300 metres
Client : Grocon Constructions

COMPANY EXPERIENCE

Oceania

Q1 TOWER

GOLD COAST, AUSTRALIA

322.5 metres
Client : Sunland Group

ASCOT METROPOLIS

AUCKLAND, NEW ZEALAND

155 metres
Client : The Ascot Ltd.

COMPANY EXPERIENCE

Oceania

GREENLAND CENTRE

SYDNEY, AUSTRALIA

235 metres
Client : Greenland Group

480 QUEEN STREET

BRISBANE, AUSTRALIA

153 metres
Client : Savills

COMPANY EXPERIENCE

Oceania

VERO CENTRE

AUCKLAND, NEW ZEALAND

170 metres
Client : Kiwi Income Property Trust

SKY TOWER

AUCKLAND, NEW ZEALAND

328 metres
Client : Skycity Entertainment Group

COMPANY EXPERIENCE

United Kingdom

ONE THE ELEPHANT

LONDON, UK

123 metres
Client : Lend Lease Communities

COMPANY EXPERIENCE

United Kingdom

HARBOUR CENTRAL

LONDON, UK

143.7 metres (Maine Tower)
Client : GDL (Millharbour) Ltd.

THE STAGE

LONDON, UK

140 metres
Client : The Stage Shoreditch Development Company

LINCOLN PLAZA

LONDON, UK

95 metres
Client : Millharbour Developments

COMPANY EXPERIENCE

The Americas

THE TOWER AT PNC PLAZA

PITTSBURGH, USA

166 metres
LEED Platinum Certification
Client : PNC Financial Services Group

OFFICES AROUND THE WORLD

AFRICA

BOTSWANA
Gaborone

MAURITIUS
Saint Pierre

MOZAMBIQUE
Maputo

SOUTH AFRICA
Cape Town
Johannesburg
Pretoria

ASIA

NORTH ASIA
Beijing
Chengdu
Chongqing
Dalian
Guangzhou
Guiyang
Haikou
Hangzhou
Hong kong
Jeju
Macau
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Shenzhen
Tianjin
Wuhan
Wuxi
Xiamen
Xian
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Poland
Portugal
Russia
Spain
Sweden
Turkey

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OMAN
Muscat

QATAR
Doha

SAUDI ARABIA
Riyadh

UNITED ARAB EMIRATES
Abu Dhabi
Dubai

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Cairns
Canberra
Canberra
Darwin
Gold Coast
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