



HONG KONG REPORT

QUARTERLY CONSTRUCTION
COST UPDATE

SEPTEMBER 2018



RLB
利比

Rider
Levett
Bucknall

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

Nanjing

Nanning

Seoul

Shanghai

Shenyang

Shenzhen

Tianjin

Wuhan

Wuxi

Xiamen

Xian

Zhuhai

SOUTH ASIA

Bacolod

Bohol

Cagayan de Oro

Cebu

Davao

Ho Chi Minh City

Iloilo

Jakarta

Kuala Lumpur

Laguna

Metro Manila

Singapore

Yangon

AMERICAS

CARIBBEAN

Barbados

Cayman Islands

St. Lucia

NORTH AMERICA

Austin

Boston

Calgary

Chicago

Denver

Guam

Hilo

Honolulu

Las Vegas

Los Angeles

Maui

New York

Orlando

Phoenix

Portland

San Francisco

Seattle

Toronto

Tucson

Waikoloa

Washington DC

EUROPE

UNITED KINGDOM

Birmingham

Bristol

Cumbria

Leeds

London

Manchester

Sheffield

Thames Valley

Warrington/Birchwood

Welwyn Garden City

RLB | EURO ALLIANCE

Austria

Belgium

Czech Republic

Finland

Germany

Hungary

Ireland

Italy

Luxemburg

Netherlands

Norway

Poland

Portugal

Russia

Spain

Sweden

Turkey

MIDDLE EAST

OMAN

Muscat

QATAR

Doha

SAUDI ARABIA

Riyadh

UNITED ARAB EMIRATES

Abu Dhabi

Dubai

OCEANIA

AUSTRALIA

Adelaide

Brisbane

Cairns

Canberra

Darwin

Gold Coast

Melbourne

Newcastle

Perth

Sunshine Coast

Sydney

Townsville

NEW ZEALAND

Auckland

Christchurch

Hamilton

Palmerston North

Queenstown

Tauranga

Wellington

COST COMMENTARY

REVIEW OF TENDER PRICE MOVEMENTS IN HONG KONG

According to Rider Levett Bucknall's Tender Price Index, which measures tender price movements of builder's works in the private sector in Hong Kong, there was a decrease of 1.4% in tender prices in the second quarter of 2018. On a year-on-year basis, the tender price decreased by 2.4%.

The following are the second quarter year-on-year tender price movements of builder's works in the private sector in the past five years:

2013 - 2014	2014 - 2015	2015 - 2016	2016 - 2017	2017 - 2018
+9.1%	+6.3%	+1.2%	-0.6%	-2.4%

Hong Kong's economy grew by 3.5% year-on-year in real terms in the second quarter of 2018, compared with the 4.6% increase in the first quarter of 2018. On a seasonally adjusted quarter-to-quarter comparison basis, real GDP decreased by 0.2% in the second quarter of 2018 over the first quarter of 2018. According to the Composite Consumer Price Index, overall consumer prices rose by 2.3% in August 2018 over the same month a year earlier, remained flat as compared to July 2018. The seasonally adjusted unemployment rate and underemployment rate stood at 2.8% and 1.1% in June - August 2018, same as that in May - July 2018.

With the completion of large infrastructure projects, the construction output at the public sector construction sites reduced significantly in recent quarters. Before the full implementation of the recently approved mega capital work projects (such as hospital developments, Cross Bay Link, Kai Tak development, etc.) and the Government's effort in increasing the supply of housing units, the construction output would remain suppressed.

With the looming interest rate rises and recent trade war between the US and the Chinese Government, there is likelihood that investors in the private sector would become more conservative due to the increasing uncertainty of the economic outlook. In the first half of 2018, the commencement of general building works in gross floor area terms was about 63% of its half-year average in the past five years. With the prospect of lower construction volume in the short term, contractors are willing to submit very competitive bids in order to maintain their order books. It is expected that the tender prices will decline further albeit moderately in the next couple of quarters.

MACAU

Macau's Gross Domestic Product increased by 6.0% year-on-year in real terms in the second quarter of 2018. The unemployment rate for May to July 2018 stood at 1.8%, same as that in the previous period (April to June 2018). The average daily wage of construction workers was MOP767 in the second quarter of 2018, decreased by 2.3% on a quarter-to-quarter basis. The average daily wages of skilled and semi-skilled workers increased by 1.1% to MOP796, while that of unskilled workers increased by 4.2% to MOP447.

In the second quarter of 2018, the construction outputs in Macau were mainly contributed by the growing investment in the infrastructure (e.g. drainage system, railway, bridge and terminal facilities, etc.) by the Government. With a larger drop in private investment following the completion of large scale tourism and entertainment facilities, tender prices in Macau will remain in a declining trend.

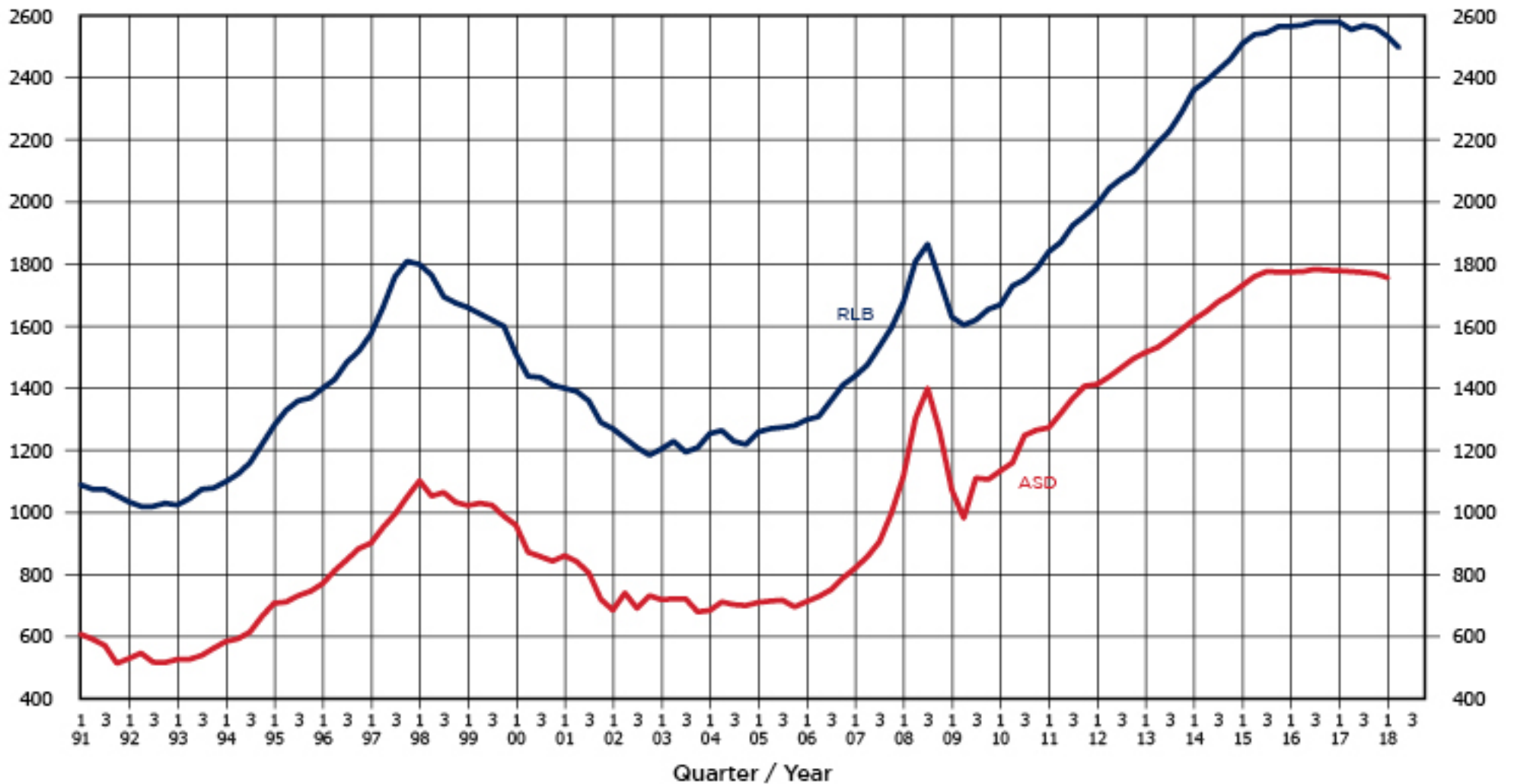
Disclaimer:

While the information in this publication is believed to be correct at the time of publishing, no responsibility is accepted for its accuracy. Persons desiring to utilize any information appearing in the publication should verify its applicability to their specific circumstances.

Cost information in this publication is indicative and for general guidance only and is based on rates at **2nd Quarter 2018**.

TENDER PRICE INDICES IN HONG KONG

RLB = Rider Levett Bucknall (Private Sector)
ASD = Architectural Services Department (Public Sector)



Graph showing cost trends in the construction industry in Hong Kong based on Tender Prices for Builder's Works

TENDER PRICE INDICES

Quarter	RLB	ASD	RLB	ASD	RLB	ASD	RLB	ASD	RLB	ASD	RLB	ASD	RLB	ASD	RLB	ASD	RLB	ASD	RLB	ASD	RLB	ASD		
	1968		1969		1970		1970		1972		1973		1974		1975		1976		1977		1978		1979	
1			104		160	100	210	140	238	144	258	160	345	206	275	145	221	150	270	164	320	203	460	262
2			112		173	106	222	143	236	146	275	167	345	213	258	145	238	153	270	174	350	208	500	285
3			130		185	124	230	144	238	158	300	190	318	203	243	137	255	153	273	185	380	230	535	304
4	100		148		198	131	238	143	245	158	325	199	290	191	228	140	263	149	300	201	420	238	550	329
	1980		1981		1982		1983		1984		1985		1986		1987		1988		1989		1990		1991	
1	570	347	620	389	630	364	560	298	570	328	560	326	605	376	665	385	785	479	960	542	1020	574	1090	608
2	570	353	620	393	620	370	560	298	570	332	555	335	615	392	690	403	820	510	960	548	1030	561	1075	592
3	600	369	630	375	600	342	540	317	570	323	565	344	630	373	700	411	865	521	985	552	1045	582	1075	573
4	610	381	630	376	580	327	560	326	560	337	585	351	655	380	740	438	925	541	1000	559	1080	596	1055	515
	1992		1993		1994		1995		1996		1997		1998		1999		2000		2001		2002		2003	
1	1035	531	1025	527	1100	586	1280	708	1400	772	1575	902	1800	1103	1660	1024	1510	959	1400	862	1270	687	1205	720
2	1020	548	1045	527	1125	594	1330	712	1430	813	1660	953	1765	1054	1640	1031	1440	873	1390	842	1240	742	1230	723
3	1020	519	1075	541	1160	615	1360	733	1485	848	1760	996	1695	1065	1620	1025	1435	858	1360	807	1210	692	1195	722
4	1030	518	1080	563	1220	666	1370	747	1520	885	1810	1051	1675	1034	1600	989	1410	844	1290	721	1185	733	1210	681
	2004		2005		2006		2007		2008		2009		2010		2011		2012		2013		2014		2015	
1	1255	685	1260	711	1300	714	1440	821	1680	1118	1630	1074	1670	1134	1840	1273	1995	1414	2145	1516	2360	1621	2510	1732
2	1265	712	1270	716	1310	730	1475	859	1810	1305	1605	983	1730	1161	1870	1320	2045	1438	2190	1532	2390	1648	2540	1761
3	1230	704	1275	718	1360	751	1535	906	1865	1401	1620	1111	1750	1249	1925	1369	2075	1467	2230	1559	2425	1679	2545	1777
4	1220	701	1280	697	1410	789	1595	998	1750	1262	1655	1107	1785	1266	1955	1408	2100	1496	2290	1590	2460	1703	2565	1775
	2016		2017		2018		2019		2020		2021		2022		2023		2024		2025		2026		2027	
1	2565	1775	2580	1779	2530	1755																		
2	2570	1776	2555	1776	2495																			
3	2580	1783	2565	1773																				
4	2580	1781	2560	1768																				

COMMON UNIT RATES IN HONG KONG

Description	Unit	Average Rates in HK\$			
		3Q2017	4Q2017	1Q2018	2Q2018
Reinforced concrete Grade 40	m ³	1,100.00	1,100.00	1,090.00	1,070.00
Sawn formwork	m ²	415.00	435.00	440.00	400.00
Deformed high yield steel bar reinforcement	kg	10.40	10.90	10.80	10.20
105 mm Solid concrete block wall	m ²	285.00	285.00	280.00	280.00
Mastic asphalt roofing overall 20 mm thick (2-coat work) on horizontal surfaces	m ²	173.00	173.00	171.00	169.00
20 mm (Finished) Timber strip flooring including plywood sub-floor, sanding and wax polishing	m ²	790.00	810.00	800.00	800.00
Timber skirting 100 mm high x 13 mm thick	m	110.00	116.00	115.00	115.00
50 mm Solid core flush door faced both sides with 5 mm timber veneered plywood including door frame, architrave, mouldings and painting (excluding ironmongery)	No.	6,600.00	6,600.00	6,500.00	6,400.00
Galvanised mild steel in balustrades, railings and general welded and framed work	kg	40.00	40.00	38.00	34.00
Structural steelwork - standard sections	kg	39.00	39.00	37.00	33.00
Fluorocarbon coated aluminium windows - frame and hardware including clear float glass and glazing (single-glazed windows)	m ²	2,900.00	2,910.00	2,880.00	2,840.00
20 mm Cement and sand (1:3) paving	m ²	110.00	110.00	109.00	107.00
Coloured unglazed ceramic mosaic floor tiling	m ²	295.00	305.00	300.00	295.00
Marble slab flooring (mid-range, European origin)	m ²	3,600.00	3,550.00	3,470.00	3,370.00
Two coats internal lime cement plaster to soffit and beams	m ²	115.00	115.00	110.00	104.00
Metal panel suspended ceiling	m ²	750.00	750.00	730.00	710.00
Ceramic / homogeneous wall tiling; internal work	m ²	610.00	610.00	605.00	590.00
Ceramic mosaic external wall tiling; adhesive fixed (45 x 45 or 45 x 95 mm tiles)	m ²	475.00	470.00	460.00	450.00
Alkali resistant primer and two coats of emulsion paint on plastered walls and ceilings	m ²	68.00	68.00	67.00	65.00

Notes:

- The unit rates above are for general guidelines of likely tendered rates obtained by competitive tendering for lump sum fixed price contracts with a normal contract period.
- The rates are also based on normal site conditions, locations and normal working hours.

2018年第2季中国主要城市单方造价指标 Approximate Order of Construction Costs in Hong Kong and Selected Cities in China

(Cost per Square Metre Construction Floor Area at 2nd Quarter 2018 Prices)

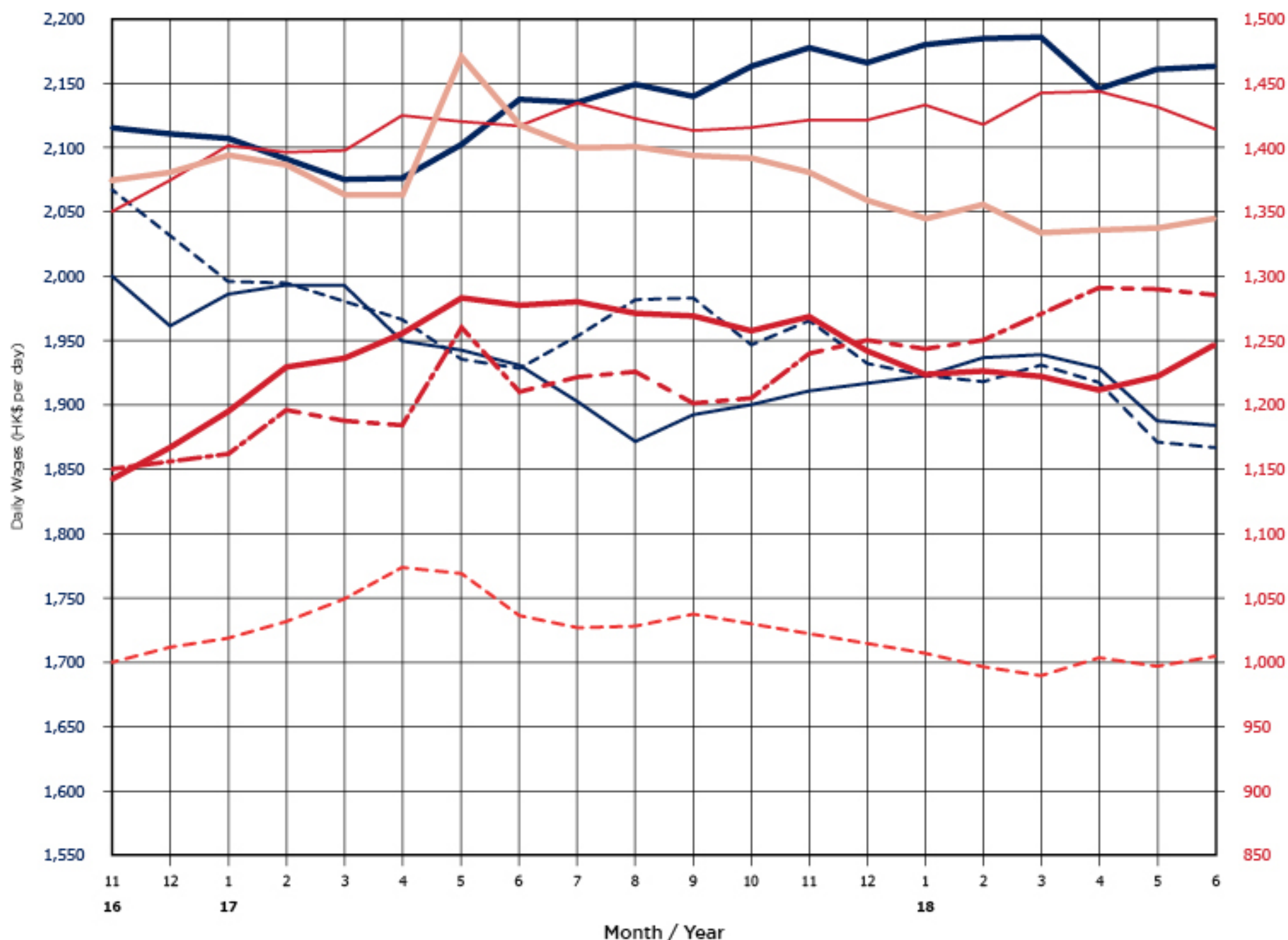
建筑物种类 Type of Building	香港 Hong Kong HK\$	澳门 Macau MOP	北京 Beijing RMB	成都 Chengdu RMB	广州 Guangzhou RMB	上海 Shanghai RMB	深圳 Shenzhen RMB	天津 Tianjin RMB	武汉 Wuhan RMB	无锡 Wuxi RMB	西安 Xian RMB	珠海 Zhuhai RMB
Office 办公楼												
High Quality 高档次	23,300 - 33,000+	18,200 - 23,100+	8,300 - 12,300	7,000 - 10,100	7,600 - 11,500	8,000 - 11,900	7,300 - 11,000	7,700 - 11,800	7,300 - 10,800	7,900 - 12,000	7,300 - 10,800	7,300 - 10,800
Medium Quality 中档次	18,500 - 22,500	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Ordinary Quality 普通档次	15,700 - 19,700	11,100 - 14,900	4,150 - 5,800	3,800 - 5,100	4,000 - 5,400	4,150 - 5,500	3,900 - 5,250	4,000 - 5,500	3,800 - 5,100	4,100 - 5,600	3,750 - 5,050	3,750 - 5,100
Shopping Centre 商场												
High Quality 高档次	29,500 - 35,500+	23,200 - 28,200+	8,400 - 13,100	7,500 - 11,600	8,100 - 12,300	8,300 - 12,800	7,900 - 12,100	N/A	N/A	N/A	N/A	N/A
Medium Quality 中档次	22,400 - 27,600	N/A	6,600 - 8,400	6,000 - 7,600	6,500 - 8,000	6,600 - 8,400	6,300 - 7,800	N/A	N/A	N/A	N/A	N/A
Residential 住宅												
High Rise; High Quality 高层; 高档次	24,200 - 36,400+	15,000 - 20,700+	4,850 - 6,700	4,000 - 5,600	4,450 - 6,000	4,550 - 6,500	4,200 - 5,800	4,500 - 6,300	4,150 - 5,950	4,600 - 6,500	4,150 - 6,000	4,150 - 6,000
High Rise; Better Quality 高层; 中档次	16,800 - 19,800	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
High Rise; Ordinary Quality 高层; 普通档次	15,200 - 16,500	8,300 - 10,000	2,600 - 3,550	2,300 - 3,200	2,500 - 3,400	2,500 - 3,450	2,450 - 3,350	2,450 - 3,450	2,300 - 3,200	2,500 - 3,450	2,300 - 3,200	2,300 - 3,200
House; High Quality 别墅; 高档次	35,100 - 52,800+	N/A	5,200 - 7,300	4,300 - 6,000	4,750 - 6,500	4,900 - 7,000	4,450 - 6,300	4,700 - 6,800	4,450 - 6,400	5,000 - 7,000	4,450 - 6,400	4,450 - 6,400
House; Medium Quality 别墅; 中档次	23,200 - 29,300	N/A	3,450 - 4,500	2,900 - 3,800	3,200 - 4,150	3,300 - 4,400	3,050 - 3,950	3,300 - 4,200	3,050 - 4,050	3,300 - 4,300	3,050 - 4,050	3,050 - 4,050
Clubhouse 会所	32,400 - 52,800+	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
External works & landscaping 室外工程 (cost/m ² external area)	4,150 - 8,900+	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Hotel (including FF&E) 酒店 (包括家具及设备)												
5-Star 五星	35,100 - 42,900+	30,500 - 36,800+	14,100 - 18,600	11,800 - 15,200	13,700 - 17,600	13,900 - 18,300	12,600 - 16,400	13,300 - 17,700	12,800 - 16,600	13,800 - 18,200	12,600 - 16,600	12,600 - 16,600
3-Star 三星	29,000 - 33,600	24,000 - 26,900	10,600 - 13,600	8,900 - 11,200	10,100 - 12,300	10,200 - 13,200	9,500 - 12,000	9,900 - 13,000	9,500 - 12,100	10,200 - 13,200	9,300 - 12,000	9,300 - 12,100
Industrial 厂房												
Landlord; High Rise 租用; 高层	10,500 - 13,000	N/A	2,900 - 3,850	2,550 - 3,500	2,800 - 3,700	2,800 - 3,850	2,700 - 3,600	2,750 - 3,650	2,600 - 3,500	2,800 - 3,800	2,600 - 3,500	2,600 - 3,500
End User; Low Rise 自用; 低层	13,600 - 20,500	N/A	4,100 - 7,100	3,700 - 6,400	3,900 - 7,000	4,050 - 7,000	3,800 - 6,900	3,900 - 6,900	3,700 - 6,400	4,050 - 7,000	3,700 - 6,400	3,700 - 6,400
Carpark 车库												
Basement; up to 2 Levels 地下室; 不多于2层	20,200 - 27,900+	10,900 - 13,500+	4,100 - 7,100	3,700 - 6,100	3,900 - 6,800	4,300 - 7,200	3,900 - 6,600	3,900 - 6,600	3,900 - 6,600	4,000 - 6,900	3,950 - 6,600	3,900 - 6,600
Multi-Storey 地上; 多层	9,100 - 11,800	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

NOTES 注:

- The construction costs above are based on prices obtained by competitive tendering for lump sum fixed price contracts with a normal contract period and are based on normal site conditions and locations. Extra costs should be allowed for projects with fast track programme, non-traditional procurement approaches and multi-phasing completion, etc. 以上单方造价指标按竞价价格下之包干合同编制, 并按正常工期、工地状况等为准。如项目采用快速施工、非传统式采购合约、分期施工等, 应考虑增加额外预算成本。
- The costs are average square metre unit costs only not based on any specific drawings / design. Therefore they provide nothing more than a rough guide to the probable cost of a building. Figures outside the given ranges may be encountered. When information is required on a specific project, it is essential that professional advice be sought. 平均单方造价并不是参考图纸或设计而编制。只可作为建筑造价之估算, 亦可能出现范围外之单价。若有特定之工程资料, 理应参考专业顾问之意见。
- The standards for each type of building in selected cities in China do not necessarily follow those in Hong Kong due to local design practices and choice of materials. 中国各城市之建筑标准、采纳之物料均有所不同, 并不需要与香港单价作比较。
- The building costs exclude furniture, fittings and equipment (except hotel / serviced apartment / clubhouse), site formation and external works, finance and legal expenses, consultants' fees and reimbursables, value of land and fluctuations in prices between the price date as specified above and the time of calling tenders. 建筑物单价并不包括家具及设备(酒店/服务式住宅/会所除外)、工地平整、室外工程、财务、法律、顾问公司等专业费用, 地价及由此单价生效日至投标时间之价格或汇率变动。
- Construction floor areas are measured to the outside face of external walls (or in the absence of such walls, the external perimeter) of the building & include all lift shafts, stairwells and E&M rooms but exclude lightwells and atrium voids. These areas are usually larger than Architect's calculation of Gross Floor Area (Plot Ratio Area). 建筑面积乃量度至建筑物外墙外面(若无外墙, 则量度至边周界), 并包括电梯井、楼梯井、机电间, 但不包括光井及大堂上部空间, 此等面积通常会大于建筑师计算之面积(容积率面积)。
- Other Specific Exclusions 其它不包括项目:
HOTEL 酒店: pre-opening expenses, operating expenses, working capital, staff training and administrative costs 开幕前费用、营运费用、开办费、员工培训及行政费等。
SHOPPING CENTRE 商场: fit out to tenant areas 租户之装修工程。
INDUSTRIAL; LANDLORD 厂房(租用): security system, air conditioning, electrical distribution in tenant areas; production and warehousing equipment; special M&E provisions 保安、空调、租户内之电器布线、生产及仓库装备, 特别机电配套等。
PROJECTS IN SELECTED CITIES IN CHINA 中国主要城市: utilities to the site beyond site boundary, connection charges and capital contribution; local authority levies and taxation; import duties 工地外之主干线、接驳费、增容费、当局行政费用、税项、入口税。

LABOUR COST TRENDS

AVERAGE DAILY WAGES OF WORKERS ENGAGED IN PUBLIC SECTOR CONSTRUCTION PROJECTS

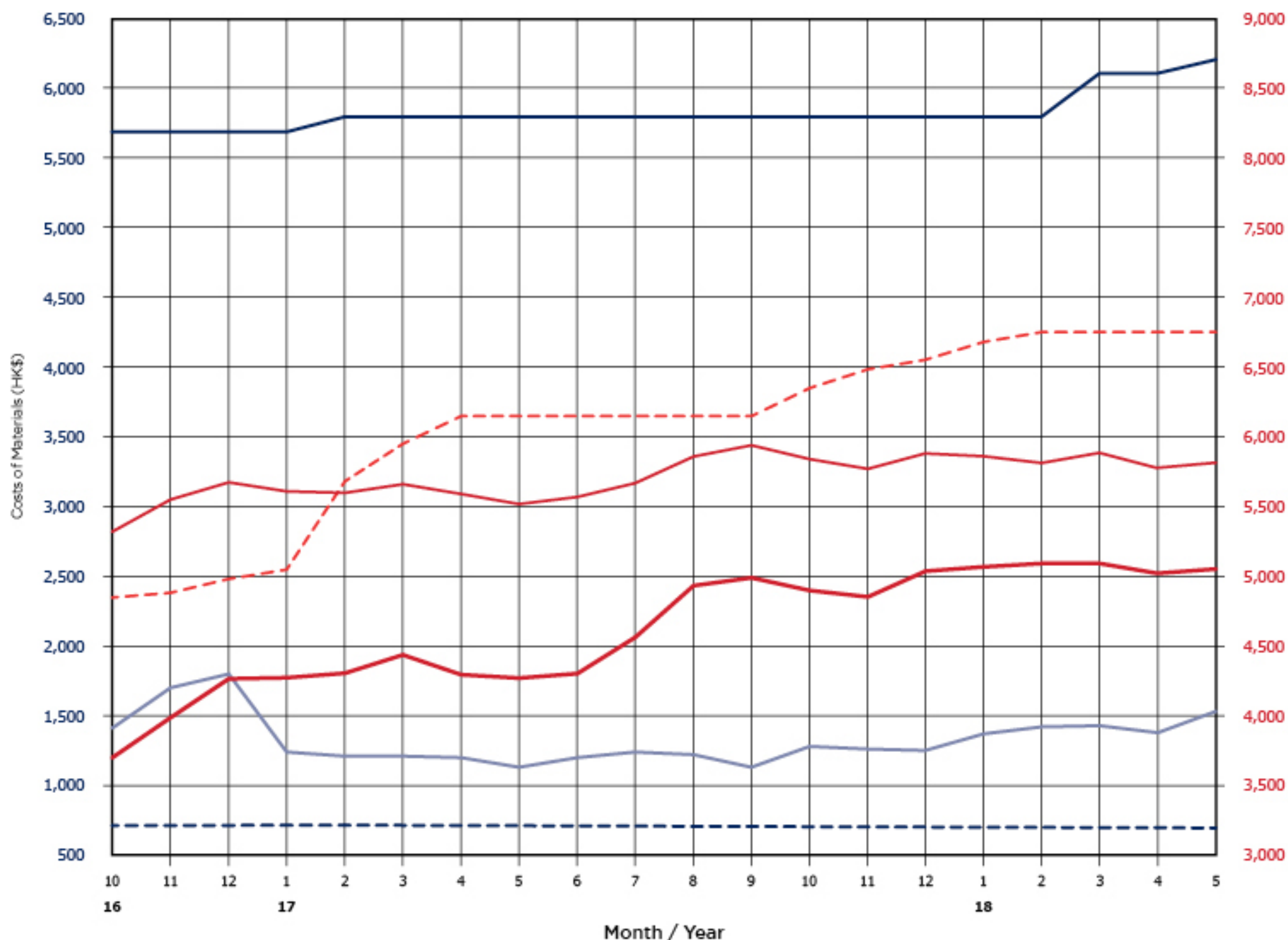


Selected Occupations	Average Daily Wages in HK\$ per day																			
	2016		2017												2018					
	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6
Bar Bender and Fitter	2,113.1	2,108.4	2,104.8	2,088.3	2,072.7	2,073.9	2,099.6	2,137.2	2,134.9	2,150.5	2,139.2	2,164.6	2,179.7	2,166.7	2,181.9	2,185.9	2,187.2	2,145.5	2,162.0	2,164.7
Concretor	2,001.2	1,959.3	1,986.4	1,993.8	1,993.8	1,946.9	1,999.1	1,926.4	1,896.9	1,876.1	1,891.8	1,897.7	1,904.8	1,911.2	1,918.5	1,932.9	1,935.5	1,924.7	1,887.4	1,894.0
Carpenter (formwork)	2,068.2	2,033.0	1,995.3	1,994.4	1,978.2	1,963.3	1,932.6	1,925.9	1,990.1	1,979.5	1,981.7	1,946.6	1,964.5	1,927.3	1,917.2	1,912.2	1,929.3	1,915.2	1,869.8	1,865.1
Painter and Decorator	1,841.7	1,168.5	1,195.6	1,225.5	1,232.3	1,253.4	1,280.5	1,271.3	1,275.4	1,268.4	1,266.4	1,257.6	1,267.9	1,239.0	1,218.0	1,223.0	1,220.8	1,210.0	1,221.4	1,245.9
Plasterer	1,375.3	1,378.1	1,394.4	1,384.5	1,361.9	1,362.7	1,472.6	1,420.3	1,398.2	1,400.2	1,393.9	1,390.8	1,381.2	1,355.0	1,342.6	1,354.6	1,333.0	1,335.3	1,336.1	1,344.1
Metal Worker	1,149.5	1,156.0	1,161.5	1,196.6	1,189.8	1,186.5	1,258.6	1,211.9	1,222.3	1,225.8	1,201.9	1,209.3	1,243.1	1,251.4	1,244.1	1,252.3	1,271.2	1,291.3	1,291.9	1,287.6
Plumber	1,347.6	1,373.7	1,403.2	1,397.0	1,397.3	1,427.9	1,423.8	1,416.7	1,435.6	1,425.3	1,415.9	1,418.3	1,424.3	1,425.0	1,437.5	1,420.4	1,442.1	1,443.6	1,435.6	1,416.9
General Workers	999.0	1,011.0	1,018.7	1,032.6	1,051.8	1,078.3	1,073.0	1,037.6	1,027.6	1,028.5	1,039.5	1,029.2	1,021.2	1,012.9	1,005.9	995.2	988.8	1,002.4	998.2	1,003.9

(Source: Census and Statistics Department)

MATERIAL COST TRENDS

AVERAGE WHOLESALE PRICES OF SELECTED BUILDING MATERIALS



		Average Wholesale Prices of Selected Building Materials																			
Building Materials		2016			2017												2018				
		10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5
Sand (\$/10 t)	—	1,410	1,700	1,800	1,240	1,210	1,210	1,200	1,130	1,200	1,240	1,220	1,130	1,280	1,260	1,250	1,370	1,420	1,440	1,380	1,520
Bitumen (\$/t)	- - -	4,850	4,883	4,983	5,050	5,683	5,950	6,150	6,150	6,150	6,150	6,150	6,150	6,350	6,483	6,550	6,683	6,750	6,750	6,750	6,750
Portland Cement (\$/t)	- - -	713	713	713	712	711	707	702	702	695	695	695	695	695	695	695	692	692	692	692	693
Sawn Hardwood 50x75 (\$/m ²)	—	5,707	5,707	5,707	5,707	5,814	5,814	5,814	5,814	5,814	5,814	5,814	5,814	5,814	5,814	5,814	5,814	5,814	6,105	6,105	6,260
Mild Steel Round Bars (\$/t)	—	5,320	5,550	5,675	5,610	5,600	5,660	5,590	5,520	5,570	5,670	5,860	5,940	5,840	5,770	5,880	5,860	5,810	5,900	5,760	5,795
High Tensile Steel Bars (\$/t)	—	3,700	3,985	4,264	4,272	4,304	4,437	4,295	4,270	4,303	4,562	4,933	4,987	4,896	4,852	5,035	5,066	5,091	5,092	5,043	5,099

(Source: Census and Statistics Department)

Cost Model – Data Centres

Data centre is a purpose-built building to provide reliable and secure data management and storage for information and technology (IT) operations. For industrial-scale operation, it usually comprises data centre halls for the accommodation of IT systems and associated components, such as server racks, and infrastructure facilities with one or multiple power paths with redundant components, to provide an uninterrupted data centre services. Tier classification levels of data centre are as follows:-

Type	Tier I Basic	Tier II Redundant Components	Tier III Concurrently Maintainable	Tier IV Fault Tolerant
Minimum capacity components to support the IT load	N	N+1	N+1	N After any Failure
Distribution paths – electrical power backbone	1	1	1 Active and 1 Alternate	2 Simultaneously Active
Critical power distribution	1	1	2 Simultaneously Active	2 Simultaneously Active
Concurrently maintainable	No	No	Yes	Yes
Fault tolerance	No	No	No	Yes
Compartmentalization	No	No	No	Yes
Continuous cooling	No	No	No	Yes

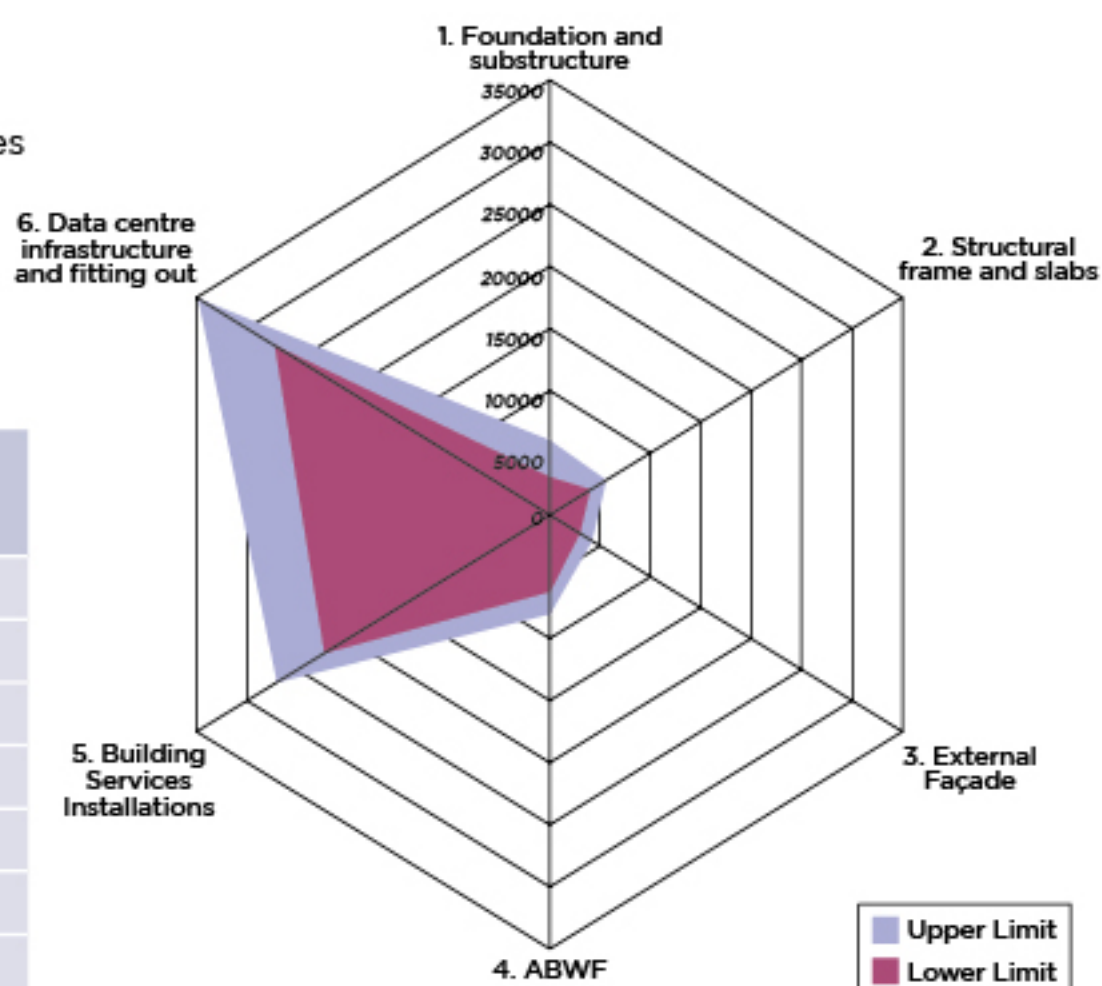
(Source: Uptime Institute)

Our cost model for Tier III + Data Centres in Hong Kong indicates that the unit cost range is from HK\$65,700 to HK\$85,600+ per m² of construction floor area (CFA) at 2nd Quarter 2018 price level. The variance in unit costs is mainly due to the difference in the rack power density, the requirement of cooling technologies and fire protection measures, and the extent of infrastructure and fitting out works to the data halls.

Cost Range (at 2nd Quarter 2018 price level)

	Range of Costs (HK\$/m ² CFA)
1. Foundation and substructure	3,000 ~ 6,000
2. Structural frame and slabs	5,000 ~ 6,000
3. External Façade	3,000 ~ 4,200
4. Architectural, Builders' Work and Finishes	6,200 ~ 8,000
5. Building Services Installations	22,300 ~ 27,000
6. Data centre infrastructure and fitting out	27,200 ~ 34,800+
Total:	65,700 ~ 85,600+

Cost Model - Data Centre
HK\$ per m² Construction Floor Area



Notes:

- The cost model should be regarded as guidelines to indicate the likely range of data centre costs for early stage cost planning. Actual costs will depend, among others, on the final design and the eventual selection of materials.
- Building services works includes general electrical installation, ventilation and air-conditioning installation, fire services installation, plumbing and drainage, etc.
- Data centre infrastructure includes core facilities to support the data halls, such as uninterruptible power supply system, structured cabling infrastructure, data centre IT backbone, CRAC system, hot/cold aisle solution, generator sets, security system, water leakage detection system, associated accessories, etc.

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