June 2023

CHINA REPORT

CONSTRUCTION PROCUREMENT AND COST INTELLIGENCE

RLB 利比 Rider Levett Bucknall

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ANALYSIS OF COST COMPOSITION OF COLD CHAIN LOGISTICS PROJECTS

Cold chain logistics refers to the whole-process management of temperature-sensitive products in the processes of collection, production, processing, storage, transportation, and sales under temperature-controlled environments. With the rapid development of food safety and the pharmaceutical industry, the cold chain logistics market is growing rapidly. However, the cost of cold chain logistics projects is relatively high, with a large initial investment. This article will provide a detailed analysis of the cost composition of cold chain logistics projects and explore how to effectively control costs while ensuring project quality.

I. Cost Composition of Cold Chain Logistics Projects

The cost of cold chain logistics projects mainly consists of the following parts:

1.Land cost.

2.Design, supervision, and cost consultancy cost: The cost of cold storage design and planning, including design fee, supervision fees, cost consultancy fees, and other related costs.

3.Construction cost: The cost of human resources, materials, machinery, etc. during the project construction process, including earthwork, pile foundation and ground treatment, flooring, structure, decoration, mechanical and electrical fire protection, supporting buildings and outdoor landscaping, etc.

4.Equipment cost: The cost of purchasing refrigeration equipment, insulation materials, shelves, and other related equipment used in the cold chain logistics process.

5.Supervision cost: The costs during the project construction process, including environmental approvals, fire inspections, cold storage quality assessments, and other related costs.

6.Operating cost: The cost of daily operations, including electricity, water, rent, labor, and maintenance costs.

Cost composition of cold chain logisics projects	Unit Cost (RMB/m^2)	Cost%
Design, supervision, and cost consultancy cost	80-100	1.4%-2%
Construction cost	3,000-3,400	53%-55.7%
Equipment cost	2,400-3,000	42%-49%
Supervision cost	25-35	0.4%-0.5%
total	**5,650-6,100**	**100%**

Remarks:
The above costs are based on actual cost data for single-storey cold storage facility/ warehouse/ other appropriate building types with a height of 15-19m. Actual costs will vary depending on location, specific design and material price fluctuation at different construction time.The aforementioned costs do not include land costs and operating costs.

ANALYSIS OF COST COMPOSITION OF COLD CHAIN LOGISTICS PROJECTS

II. Why are Cold Chain Logistics Projects More Expensive than Dry Warehouses?

As shown in the above cost breakdown, the cost of cold chain logistics projects is double that of a single-storey dry warehouse of the same size. The increased costs mainly stem from the following factors:

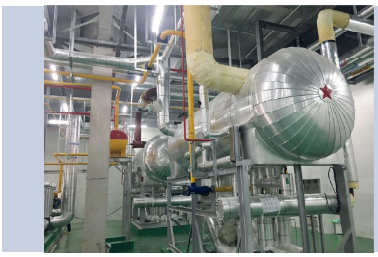
（A）Equipment cost

1.Wall and floor insulation

High-performance insulation materials are required for the walls, floors, and ceilings of cold storage to ensure temperature stability. The price of high-performance insulation materials is relatively high, increasing project costs. This insulation cost accounts for more than 10% of the total cost, with walls and ceilings mainly using 100-200mm thick PIR sandwich insulation panels. For the floor, 200mm XPS board insulation is usually used to prevent refrigerant loss. For projects with high floor heights, especially warehouses with 8-13 levels of shelves, the floor needs to have a high load-bearing capacity. As a result, the corresponding XPS board needs to have a strength of 500-650kpa, which is 10%-30% more expensive than the conventional 350kpa XPS board. Furthermore, to prevent freezing, an ethylene glycol-based anti-freezing system is typically used for the floor. Compared to the dry warehouse, the cost increases by about 800 RMB/m².

2.Refrigeration system

In addition to the insulation system around the storage area, the refrigeration system is critical to meet the temperature requirements for different cold rooms within the same storage area (-18°C/-25°C, 0°C/-25°C). High-efficiency refrigeration equipment is required to maintain a low-temperature environment, and the initial and operating costs of such equipment are high. For instance, a large cold chain park we serve uses a German-imported semi-closed compressor with variable frequency control, R507 (with a standard boiling point of -46.7°C) as an environmentally friendly refrigerant, a fluorine pump supply system, an evaporative condenser, a high heat exchange efficiency, and a ceiling-mounted cold air blower. The cooling air is sent through the air duct to solve the problem of large temperature differences between different locations in the cold room and high-power consumption of frozen food. Cost of this refrigeration system alone accounts for about 17% of the entire construction cost, which is about 1000 RMB/m² more than the cost of dry storage.



Barrel pump unit

Compressor unit

3.Special insulation doors

Special insulation doors with good insulation performance are required for cold storage to reduce energy loss. The price of special insulation doors is high, with conventional manual insulation swing doors with a size of 1200x2100mm costing around 6,000-7,000 RMB per unit, while electric refrigerated doors with an extra-large size of 2400x4800mm cost 30,000 RMB per unit, and electric refrigerated doors with a size of 2400x7200mm cost over 60,000 RMB per unit. In addition, to reduce refrigerant loss, two insulation doors are usually installed between the hallway and the cold storage . Compared to the dry warehouse, the cost increases by about 160 RMB/m².

4.Increased Power Capacity Due to Refrigeration System

The operation of refrigeration equipment requires a large amount of electricity, which increases the cost of the electrical system due to the need for larger electrical cables and more distribution boxes. This cost accounts for about 250 RMB/m².

（B）Construction Cost

1.Cold Storage Building Structure

The building structure of cold storage needs to meet requirements of insulation, moisture-proof, and compression resistance, resulting in a high investment in building materials and design. For single-storey warehouses, a door-type steel frame structure system is usually used to meet the requirements of large-span space.

2.High Requirements for Warehouse Environment

Cold chain logistics warehouses have high requirements for humidity, air quality, and other aspects, requiring the deployment of corresponding environmental monitoring equipment, which increases costs.

ANALYSIS OF COST COMPOSITION OF COLD CHAIN LOGISTICS PROJECTS

（C）Operating Cost

1.Specialized Transport Vehicles

Cold chain logistics projects require the use of specialized transport vehicles such as refrigerated trucks and refrigerated containers, which have higher inital and maintenance costs.

2.Goods Loss

Temperature-sensitive products in cold chain logistics are susceptible to damage, which may result in goods loss, increasing enterprise costs.

3.Personnel Training

Personnel in cold chain logistics need to have specialized knowledge and skills, and enterprises need to invest a certain amount of manpower and financial resources in training.

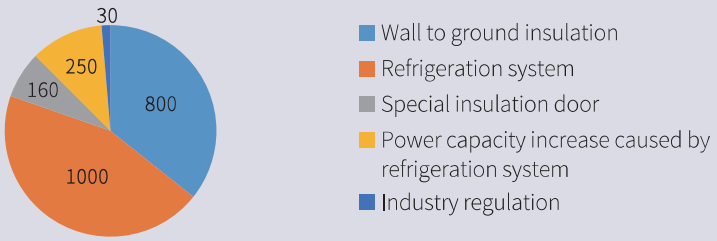
（D）Regulatory Cost

1.Industry Regulation

The cold chain logistics industry is subject to greater regulatory scrutiny, and enterprises need to invest funds to meet various compliance requirements.

The specific incremental costs are as follows:

Increment over dry warehouse cost
2,240 RMB/m²



III. Effective Cost Control Measures

To effectively control costs while ensuring project quality, the following measures can be taken:

1.Optimize design and construction plans: By optimizing the design and construction plans, the project can be made more reasonable and efficient, thereby reducing costs.

2.Choose cost-effective materials and equipment: Through careful selection of materials and equipment, the project can achieve the desired quality while reducing costs.

3.Improve energy efficiency: By using energy-efficient refrigeration equipment and insulation materials, the project's operating costs can be reduced.

4.Properly manage labor costs: By optimizing the staffing structure and improving labor productivity, the project's labor costs can be reduced while maintaining quality.

5.Strengthen maintenance management: By strengthening maintenance management, the service life of equipment can be extended, and maintenance costs can be reduced.

The cost of cold chain logistics projects is influenced by various factors, mainly concentrated in the equipment costs, including insulation materials, refrigeration systems, special doors, and power capacity expansion, among others. In actual projects, it is essential to fully understand the elements of costs and make rational planning and selection of equipment and materials to achieve the project's economic benefits and sustainable development. By adopting strategies such as optimizing design schemes, introducing new technologies, rational layout, management optimization, and seeking policy support, the cost of cold chain logistics projects can be effectively reduced, thereby enhancing the competitiveness of enterprises.

PREFABRICATED BUILDING: A NEW MODEL OF COST CONTROL AND ITS CHALLENGES AND OPPORTUNITIES

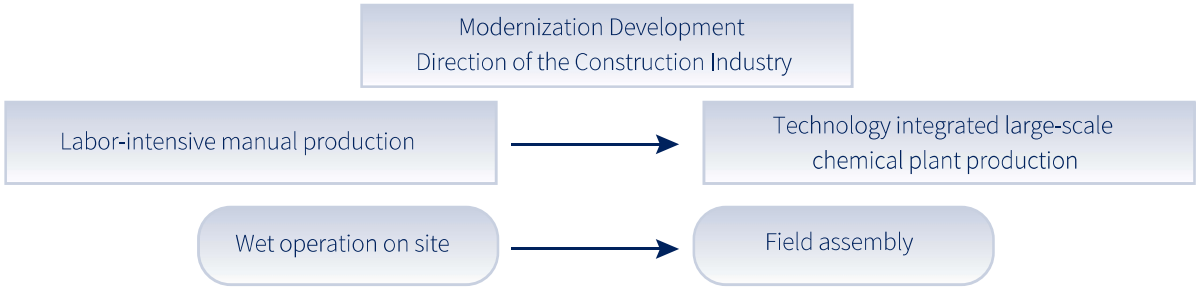
Let's boldly imagine how the buildings we will live in the future will be constructed?
Will they continue to be built using traditional methods that rely on continual refinement and upgrades of traditional crafts?
The answer is no, it will be like the building block game that everyone has experienced since childhood, and this new way is constantly replacing traditional construction methods.
What kind of new model is that? Next, we will take everyone to further understand and interpret in depth.

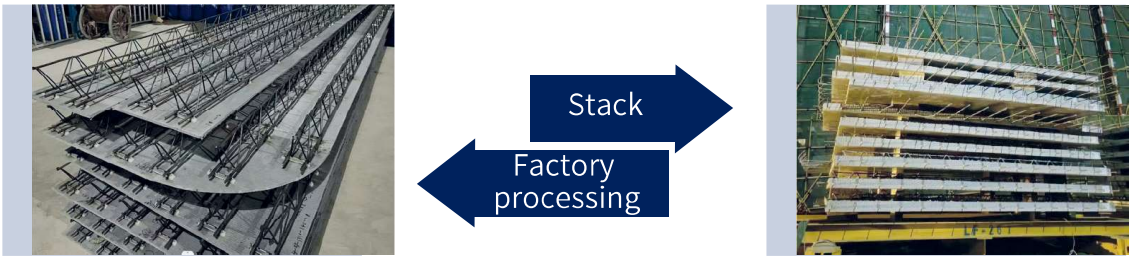
Picture/Ding Feng Real Estate/Chengdu Lakeshore Place Project

Prefabricated building (PC) is an integrated house. Simply put, it is a construction method where some or all components of a building are manufactured and prefabricated in a factory, and then transported to the site for assembly.

PC=
Prefabricated factory line production
+
Building block assembly on site

Compared with the traditional cast-in-place concrete and masonry buildings, prefabricated building has the advantages of faster construction speed, higher construction quality and better environmental performance. In China's real estate construction, prefabricated building, as a modern new green and environment-friendly building model, is the inevitable development trend of the future construction industry. The development of prefabricated building is also increasingly concerned and promoted.





This article will lead you to discuss how to promote the cost control of prefabricated building, as well as the development trend of prefabricated building in the future, the industry opportunities and how to overcome these challenges.

PREFABRICATED BUILDING: A NEW MODEL OF COST CONTROL AND ITS CHALLENGES AND OPPORTUNITIES

1、 Positive significance of prefabricated building to cost control

1.1 Reduce labor costs

The prefabricated building can carry out the automatic production of PC components in the factory, which not only reduces the labor input of factory prefabrication, but also avoids a large number of labors required for on-site construction, greatly reducing the labor cost on the whole.

1.2 Reduce material waste

The PC component manufacturing of prefabricated building adopts mechanical automation operation, and various data can be accurately calculated and controlled, which improves the utilization rate of materials, thus reducing the waste of resources, and can truly achieve "three savings": energy saving, water saving and material saving.

1.3 Shortening construction time

The PC components of prefabricated building are produced in the factory, and then transported to the construction site. They only need to be assembled on the site, which is called industrialized buildings. The integration of the exterior wall enclosure structure and the main structure is completed, eliminating processes such as exterior wall insulation and decoration, and eliminating the removal of external frames. This greatly shortens the construction period, improves construction efficiency, and reduces capital costs.

1.4 Reducing pollution and promoting environmental protection

Prefabricated building can better control the appearance of waste and noise in the manufacturing process, reduce environmental pollution and save building materials. During the construction process, it can effectively reduce the generation of construction waste and dust, as well as the discharge of construction sewage, in line with the modern society's demand for green, low-carbon, and environmentally friendly buildings, and actively promote the transformation and upgrading of the construction industry.

2、 Suggestion and cost analysis of prefabricated component configuration for assembly rate

With the vigorous promotion and application of prefabricated building in recent years, the requirements for the prefabricated assembly rate of buildings are also increasing, from 20% to 30%, to 40%, 50%, 65%

Let's explore at the specific changes in PC component configuration and construction costs by taking a 40% assembly rate as an example.

If the prefabricated assembly rate of a single building reaches 40%, it means that 40% or more of the building components need to be prefabricated in the factory. This configuration can ensure the quality of the building while reducing the complexity and cost of on-site construction.

2.1 Recommendations for Prefabricated Component Configuration

For residential fit-out projects, it is recommended to prioritize the use of the "two board" plan. The so-called "two board" refers to the combination of stacked boards and partition boards, which are the main components accounting for a large proportion. Then, secondary components such as stairs, balcony panels, air conditioning panels, etc. can be considered. Finally, interior finishes , such as the kitchen and bathroom, can be completed with a suspended ceiling, thin wall tiles, and separate pipelines, and by incorporating integrated kitchens, bathrooms, and separate pipelines.

2.2 Cost Incremental Analysis

Calculation of 40% assembly rate cost increment for a high-level residential project:

No.	Component Name	Conventional	Prefabricated	Cost variance (b)-(a) (RMB/m²)	Remarks
		Construction cost (RMB/m²) (a)	Construction cost (RMB/m²) (b)		
1	Laminatedslab	175.05	327.84	152.79	Traditional cast-in-place floor thickness:100mm; The laminated floor slab is 60mm(laminated)+60mm (cast-in-place)
2	Staircase	36.78	54.92	18.14	
3	Partition board	6.00	22.65	16.65	
	Total			**187.58**	

PREFABRICATED BUILDING: A NEW MODEL OF COST CONTROL AND ITS CHALLENGES AND OPPORTUNITIES

According to the actual project data, the incremental cost of construction and installation of prefabricated building with 40% assembly rate is about 190 RMB/m², and the accurate data needs to be adjusted according to the project business type, structural form, component content index and local price level.

From the current implementation of PC components in high-rise residential buildings, existing engineering practices have shown that their construction costs are generally higher than cast-in-place structures. The main reasons for this are as follows:
A) The standardization of prefabricated components is relatively low, and the integration of design, production, and construction is relatively low;
B) Prefabricated components have not formed a complete industrial chain, and large-scale procurement, production, and transportation have not achieved;
C) Insufficient experience in workers and project management in the prefabricated component industry.

In response to the above reasons, breakthroughs can be found from the following countermeasures:
1. Optimize the design, improve the standardization of components, improve the prefabrication rate of buildings, leverage the advantages of integrated assembly, and improve production and construction efficiency;
2. Improve the scale effect of prefabricated components and achieve local integration;
3. Strengthen technical training for existing industrial workers and management personnel.

3、 Future development trend of prefabricated building

3.1 Requirements for land acquisition
In order to further promote the application of prefabricated building and the green and low-carbon transformation of construction methods, the Ministry of Housing and Urban Rural Development of China proposed in the 《"14th Five Year" Construction Industry Development Plan》 issued earlier that by 2025, prefabricated building will account for more than 30% of new buildings. Prefabricated building is one of the important directions of future construction industry development, and the building assembly rate has gradually become a mandatory condition for new residential land acquisition.

3.2 Technological Innovation
Prefabricated buildings need to use advanced production technology and equipment in the factory production process, which will promote more technological innovation and improvement in the future, and PC products are gradually becoming standardized and automated.

3.3 Industry Standards
With the popularization and promotion of prefabricated building, the application field of PC components has gradually expanded, and more stringent national and industrial standards and regulations will be issued in the future, which has promoted the industrialization of the construction industry, and facilitate cost control of prefabricated building.

3.4 Policy support
The government will increase support for prefabricated building and provide more policy support and financial subsidies to promote the application of prefabricated building. Taking Chongqing as an example, eligible development enterprises can apply for positive or negative pre-sales for their prefabricated demonstration projects, reducing project operating capital costs. Projects with a 65% assembly rate can also enjoy a 15% reduction in corporate income tax for developments in West China, and relax project capital supervision.

3.5 Multi discipline composite pattern
Prefabricated building requires updating its inherent ideas and technologies from development and construction to design and construction, emphasizing the cooperation of all parties, which will be a change for real estate, design, construction and production, and PC+BIM+green multi discipline integration will become the most popular management mode at present.

PREFABRICATED BUILDING: A NEW MODEL OF COST CONTROL AND ITS CHALLENGES AND OPPORTUNITIES

4、 Challenges faced in prefabricated building

4.1 Shortage of highly skilled industrial workers

Prefabricated buildings need a large number of skilled workers. From the perspective of the whole industrial chain of prefabricated building, talent training and training in design, production, construction, operation and maintenance and other aspects are still relatively weak, lacking strong support. The quality of industrial workers is generally not high, and professional competence is one of the key factors restricting product quality and production efficiency. Currently, the lack of professional talents is an important factor restricting their development. But at the same time, market demand can also promote the transformation of migrant workers to construction workers, accelerate the process of urbanization, and the continuous urbanization construction will reverse the continuous growth of the prefabricated building industry.

4.2 Inferior Market Acceptance

The prefabricated building industry is still in the early stage of development. Although it has the advantages of energy conservation, environmental protection and labor saving, its direct construction cost is still higher than that of the traditional construction industry, and its acceptance in the country needs to be improved. Therefore, companies in the prefabricated building industry as a whole face fierce competition from traditional construction enterprises, and there are still some difficulties and obstacles in market promotion, so further promotion and publicity are needed.

4.3 Increasing Demands for Energy Conservation and Environmental Protection

The prefabricated building adopts factory prefabrication, on-site assembly and other methods, which significantly shortens the construction period, reduces energy consumption, saves resources, reduces dust, noise, construction waste and other environmental pollution, and brings significant energy conservation and environmental protection effects. The increasing requirements of energy conservation and environmental protection in the construction industry will promote the popularity of prefabricated building.

4.4 Continuously Improving the Technical Standards System

At present, the focus of industry development is mainly on prefabricated concrete shear wall residential buildings. The development of frame structures and other types of prefabricated structures is not balanced, which cannot support the healthy development of the entire prefabricated concrete industry. At present, most prefabricated shear wall residential buildings adopt the technology of bottom vertical steel bar sleeve grouting or slurry anchor lap connection, and edge components are cast-in-place. There is still little research on other technical systems, and further research is needed in the future. Prefabricated buildings need to strengthen quality control and supervision to avoid quality problems caused by factory production and on-site assembly not meeting the requirements. The improvement of technical system standardization is the first prerequisite for quality control.

5、 Conclusion

Prefabricated building has been widely concerned and applied in the world. As a green, energy-saving and efficient building mode, prefabricated building has significant advantages in cost control.

Following the above analysis, we see that prefabricated buildings have obvious advantages in cost control, but also face some challenges and opportunities. In the future, with the continuous strengthening of technological innovation, industry norms and policy support, prefabricated buildings will have a broader development prospect. At the same time, it is also necessary to strengthen the attention and efforts in talent training, market promotion, energy conservation, environmental protection and quality control to maximize the value of prefabricated building in cost control and sustainable development.

Through continuous technological innovation, industry standard improvement and policy support, we believe that prefabricated building will bring revolutionary changes to the future construction industry and make greater contributions to the sustainable development of society.

Picture/Prefabricated buildings are more widely used

AVERAGE WHOLESALE PRICES OF SELECTED BUILDING MATERIALS IN SELECTED CITIES OF CHINA (RMB)

(All rates described are at 1st Quarter 2023 Prices)

	Building materials		Beijing	Chengdu	Chongqing	Guangzhou	Hangzhou	Nanjing	Shanghai	Shenyang	Shenzhen	Tianjin	Wuhan	Xian
1	Reinforcement bar HPB300 10mm	¥/t	5,350	4,516	4,553 8mm	5,349	4,813	4,708	4,768	4,859	4,863	4,408	4,556	4,673
2	Reinforcement bar HRB400 (3rd class) 10mm	¥/t	5,091	4,482 HRB400E	4,547 HRB400E	5,262	4,617	4,766	4,570	4,603	4,921 HRB400E	4,248	4,505	4,540
3	Reinforcement bar HRB400 (3rd class) 25mm	¥/t	4,737	4,321 HRB400E	4,367 HRB400E	5,045	4,483	4,562	4,418	4,350	4,683 HRB400E	4,123	4,352	4,540
4	Reinforced concrete Grade C30 5-25mm aggregates P8 waterproofing (exclude pumping fee)	¥/m^3	497	514 include pumping fee	350 include pumping fee	643	542 include pumping fee	529	681	304	645	492	484	607 include pumping fee
5	Timber Formwork local commonly used materials	¥/m^3	2,260	3,303	1,870	1,523	1,780	1,844	1,851	2,038	2,588	2,112	2,203	2,189
6	Portland cement Grade 42.5(bulk)	¥/t	520	480	473 bagged	567	467	510	523	352	520	534	420	516
7	Sand Rough/mixed	¥/t	90	141	220 extra fine sand	203	154 Gross sand	222 Coarse sand	197	67	175	95	162	172
8	Hot rolled equal -leg angle steel 45-50×3-6mm	¥/t	4,982 Q235B 50	4,555 Q235 L50×50×5	4,653 Q235B 4-8mm	5,044	4,667 Q235B	4,963 Equal-leg angle steel	4,478 Equal-leg angle steel 45-50 × 3-5mm	4,181	4,979 Angle steel	4,076	4,602 Equal-leg angle steel 45-50 × 3-5mm	4,707
9	Galvanized steel sheet 1.0mm	¥/t	5,777	7,345 0.5 - 1.2mm	5,207 Galvanized coil， 1.0×1250×C	5,437	5,589	5,308 Hot dip galvanized steel sheet Q235B	4,192 Hot rolled steel sheet Q235 δ≥1.0	5,168 Continuously hot-dip zinc-coated steel sheet 1.00~2.5 Z275 (two-sided)	5,737	4,973	5,081 Hot rolled steel sheet Q235 δ≥1.0	5,297
10	Seamless steel pipe 108×3.5-4mm	¥/t	5,806 108 x 6mm	7,420	5,423 108 x 4.5mm	6,003	6,050 108x4-8mm	5,372	6,011 108×3-4.5mm #20	5,356 68~159	6,007 Seamless steel pipe	5,107	5,168 108×4.5-5mm	5,313
11	Galvanized welded steel pipe 20mm 26.75x2.75mm	¥/t	6,603	7,369	5,980 Hot dip galvanized steel pipe Q235 / Q195 DN15-20	7,154 Galvanized water, gas transportation pipe	6,095 20*2.8mm	5,916 Hot dip galvanized steel pipe DN15~DN32	5,210 Φ20 mm	5,786 DN25~DN32	6,222 Hot dip galvanized steel pipe	5,618	6,076 20×2.75mm	5,620
12	Hot-rolled steel channel Grade a steel #16-18mm	¥/t	5,021	4,594 Q235 #16mm	4,730 Q235 16-22#	5,153	4,636 Q235	4,827 Steel channel	4,680 Q235 16#	4,268 5~30#	4,988 Steel channel	4,070	4,568	4,643
13	Glass FG	¥/t	1,499											
14	Aluminium al	¥/t	18,418											
15	Copper cu	¥/t	68,660											
16	Dry-mixed plastering mortar DP M10	¥/t	362	452	305	531	382	453	434	414	-	330	327	399
17	Prefabricated laminated slab 150kg/m^3	¥/m^3	3,657 140kg/m^3	2,267 This information price is according to concrete 350 yuan /m^3, reinforcement 3 yuan /kg	2,755 140kg/m^3	3,456 130-160kg/m^3	2,671	3,141 100kg/m^3	3,491	-	-	3,863 140kg/m^3	3,107	4,083
18	APP Modified Bitumen Waterproofing membrane 3 mm PY	¥/m^2	39 SBS Ⅱ PY PE PE3	-	27 PY-Ⅰ-PE/D-3.0mm	34	34 SBS 3mm	38	30 APP-Ⅰ-PY-PE	36 SBS 3mm-25°C	34 SBS 3mm	37 SBS 3mm	27	-
19	JS Cementitious Waterproofing Coatings Type Ⅰ two-component	¥/kg	15	-	9 JS-II (two-component)	14	8	8	13 JS-I	9	12	14	21 Noncurable rubber modified asphalt waterproofing coating	-

Notes:

1. The above prices (except items 13, 14, 15) are based on either guiding price from websites or periodicals published by local construction cost management office; or market prices published by "China construction material online" ;
2. Items 13 in the above table are based on closing price by the 10th trading day of month published by Zhengzhou Commodity Exchange (www.czce.com.cn/cn/index.htm), as a general reference price for all areas;
3. Items 14 & 15 in the above table are based on closing price by end of month published by Shanghai Futures Exchange (www.shfe.com.cn), as a general reference price for all areas;
4. "-" means local price is not available;
5. The unit price in the above table is VAT.

AVERAGE DAILY WAGES OF WORKERS FOR CONSTRUCTION INDUSTRY IN SELECTED CITIES OF CHINA (RMB)

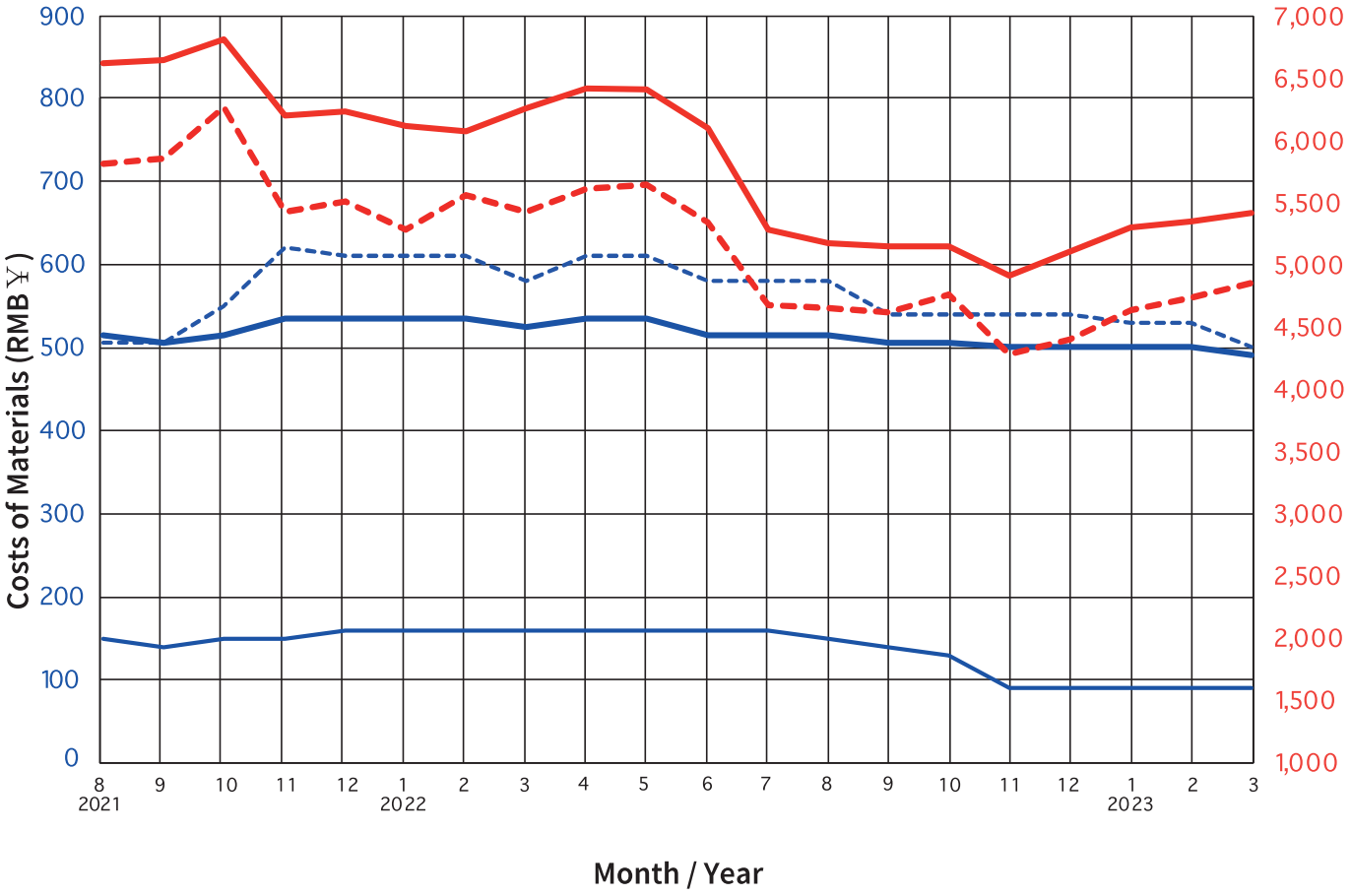
(All rates described are at 1rd Quarter 2023 Prices)

	Selected Trades (according to the general public standards)	Beijing	Chengdu	Chongqing	Guangzhou	Hangzhou	Nanjing	Shanghai	Shenyang	Shenzhen	Tianjin	Wuhan	Xian
1	Joiner (construction)	369	346	278	317	307	301	360	281	398 Decoration Joiner	356	284	350
2	Painter	347	254	247	292	276	274	390	265	347	301	225	400
3	Formwork erector	384	322	294	331	312	302	370	269	402	321	284	380
4	Plasterer (normal)	355	273	238	292	266	249	385	281	352	317	234	320
5	Bar Bender	357	302	277	313	304	293	370	235	369	318	274	330
6	Bricklayer (masonry)	353	276	239	299	312	271	365	276	358	315	250	320
7	E&M worker	348	250	237	292	263 Metal worker	254 Metal worker	380	260	348 Average plumber/ electrician	293	233	330
8	Concretor	305	269	244	292	259	263	365	187	348	291	236	300
9	Waterproofing worker	347	239	232	284	275	270	360	264	330	321	225	300
10	Plasterer (Surface)	433	281	264	306	280	275	420	309	399	348	234	350
11	Scaffolder	383	307	284	313	324	278	420	289	395	325	271	350
12	Welder	366	308	242	306	309	270	400	267	362	307	234	350
13	Rigger	300	251	201	288	271	261	350	279	335	275	211	350
14	Glazier	355	251	222	284	261	253	360	233	347	278	196	400
Average daily wage (1-14)		**357**	**281**	**250**	**301**	**287**	**272**	**378**	**264**	**363**	**312**	**242**	**345**

Notes:

1. Various types of daily wage are based on construction market price, which are updated in real time. The data covers commercial, residential and industrial development project; the rate is based on the weighted daily rates received from 2-4 contractors;
2. Labour costs include: basic wage, allowances, benefits, etc. i.e. all expense payable to workers;
3. Daily rate is based on 8 hours per day, excluding overtime allowance;
4. All trades are based on general labour.

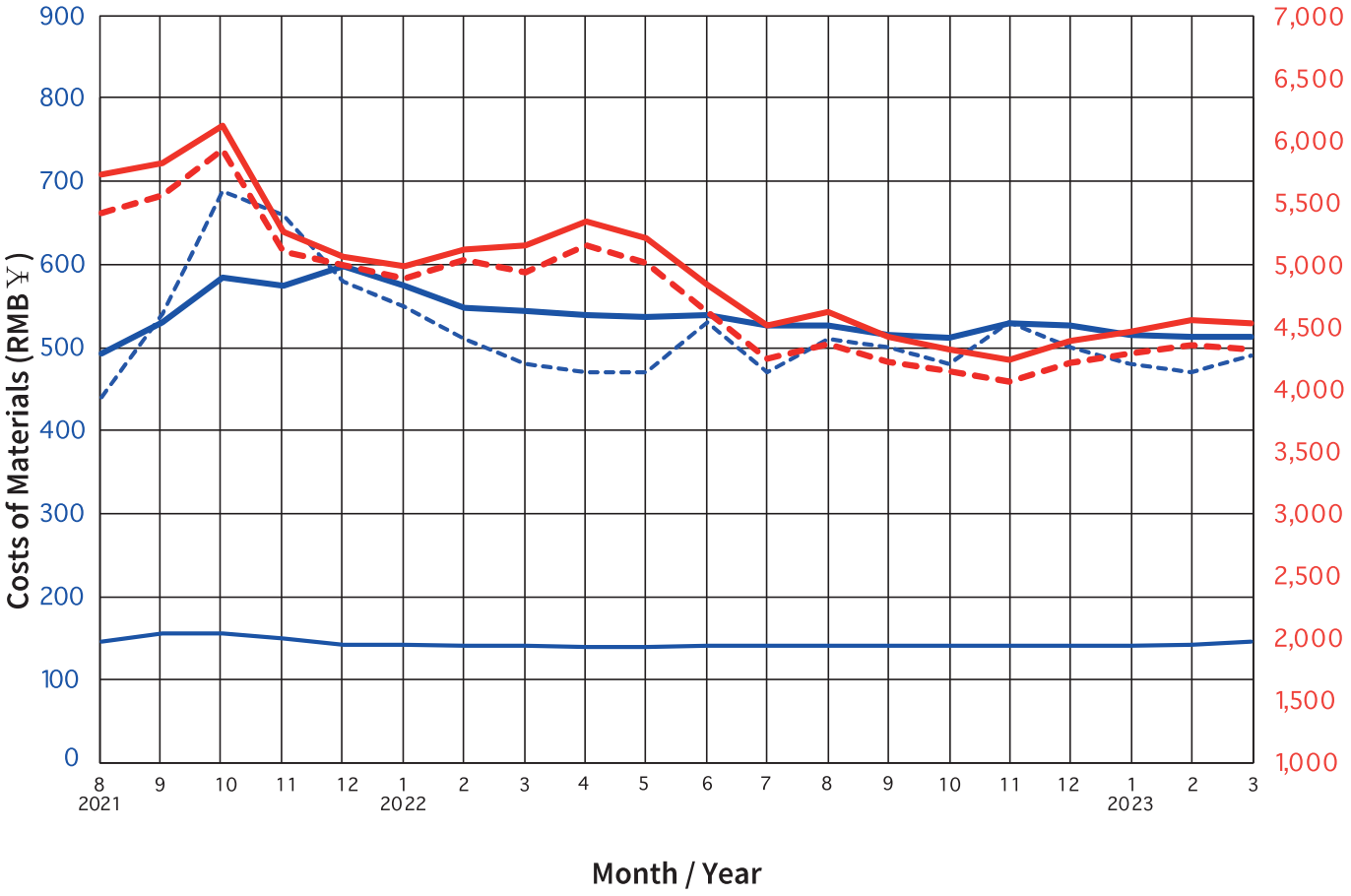
Wholesale Prices of Selected Building Materials in Beijing



Building Materials			Wholesale Prices of Selected Building Materials in Beijing																			
			2021					2022											2023			
			Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar
Reinforcement bar HPB235 (I) 10mm	¥/t	—	6,612	6,638	6,801	6,193	6,223	6,109	6,066	6,246	6,406	6,403	6,093	5,273	5,166	5,140	5,143	4,910	5,096	5,290	5,346	5,413
Reinforcement bar HRB400 (III) 25mm	¥/t	·····	5,803	5,844	6,261	5,417	5,499	5,273	5,552	5,422	5,602	5,636	5,332	4,669	4,649	4,612	4,756	4,279	4,396	4,632	4,729	4,849
Portland cement Grade 42.5 (bulk)	¥/t	·····	505	505	550	620	610	610	610	580	610	610	580	580	580	540	540	540	540	530	530	500
Reinforced concrete Grade C30 5-25mm aggregates P8 waterproofing (exclude pumping fee)	¥/m³	—	515	505	515	535	535	535	535	525	535	535	515	515	515	505	505	500	500	500	500	490
Sand (rough/mixed)	¥/t	—	150	140	150	150	160	160	160	160	160	160	160	160	150	140	130	90	90	90	90	90

(Source: www.bjzj.net)

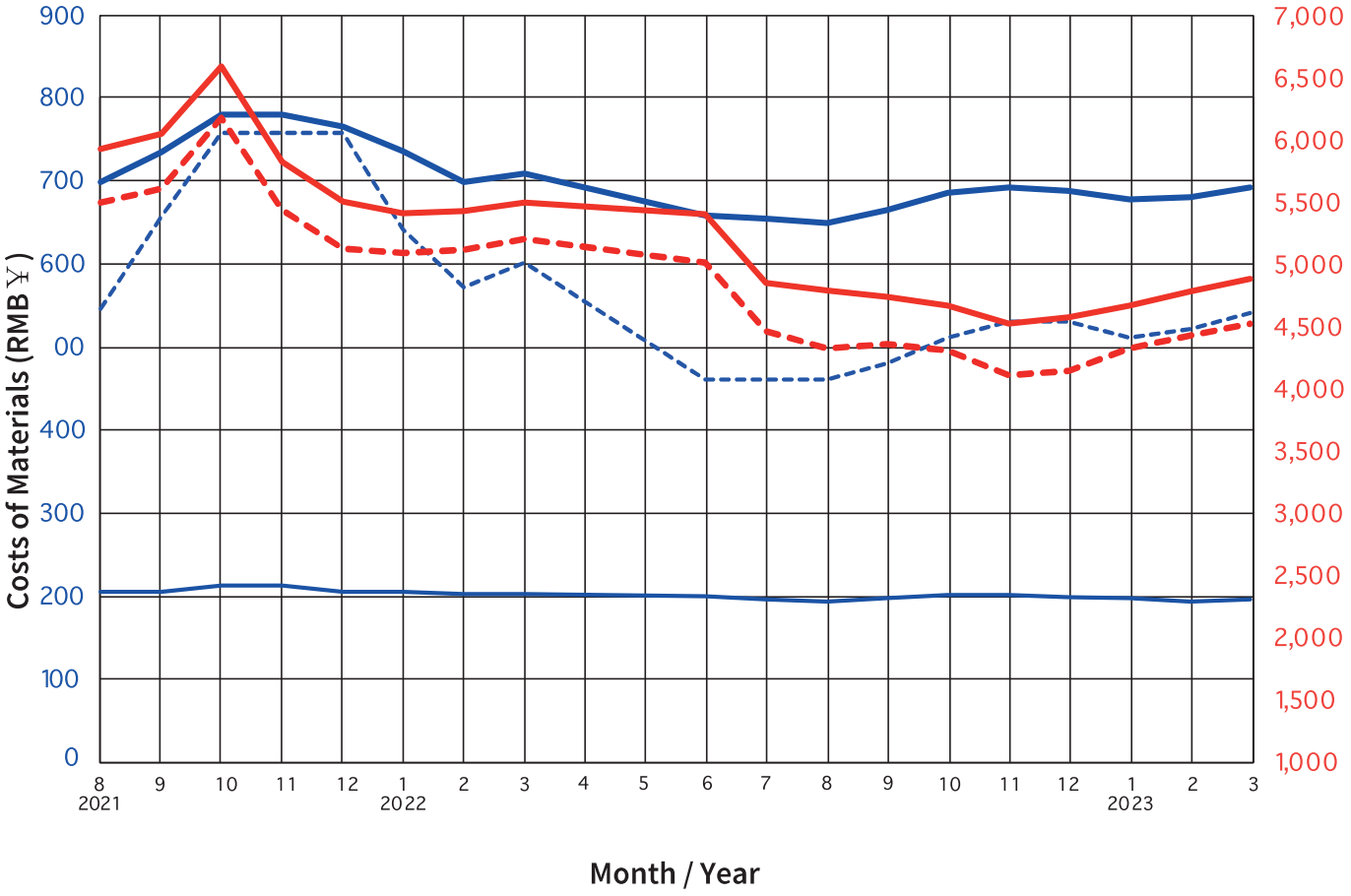
Wholesale Prices of Selected Building Materials in Chengdu



Building Materials			Wholesale Prices of Selected Building Materials in Chengdu																			
			2021					2022											2023			
			Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar
Reinforcement bar HPB235 (I) 10mm	¥/t	—	5,730	5,822	6,126	5,267	5,066	4,992	5,124	5,160	5,350	5,218	4,840	4,511	4,623	4,416	4,322	4,238	4,390	4,465	4,554	4,527
Reinforcement bar HRB400 (III) 25mm	¥/t	·····	5,420	5,564	5,931	5,113	4,997	4,892	5,039	4,940	5,156	5,019	4,618	4,240	4,363	4,217	4,142	4,061	4,207	4,287	4,355	4,319
Portland cement Grade 42.5 (bulk)	¥/t	·····	440	540	690	660	580	550	510	480	470	470	530	470	510	500	480	530	500	480	470	490
Reinforced concrete Grade C30 5-25mm aggregates P8 waterproofing (exclude pumping fee)	¥/m³	—	492	530	585	575	598	575	548	545	540	537	540	527	527	515	512	529	526	516	513	513
Sand (rough/mixed)	¥/t	—	143	153	153	147	140	140	138	138	137	137	138	138	138	138	138	138	138	138	140	143

(Source: www.sceci.net)

Wholesale Prices of Selected Building Materials in Shanghai

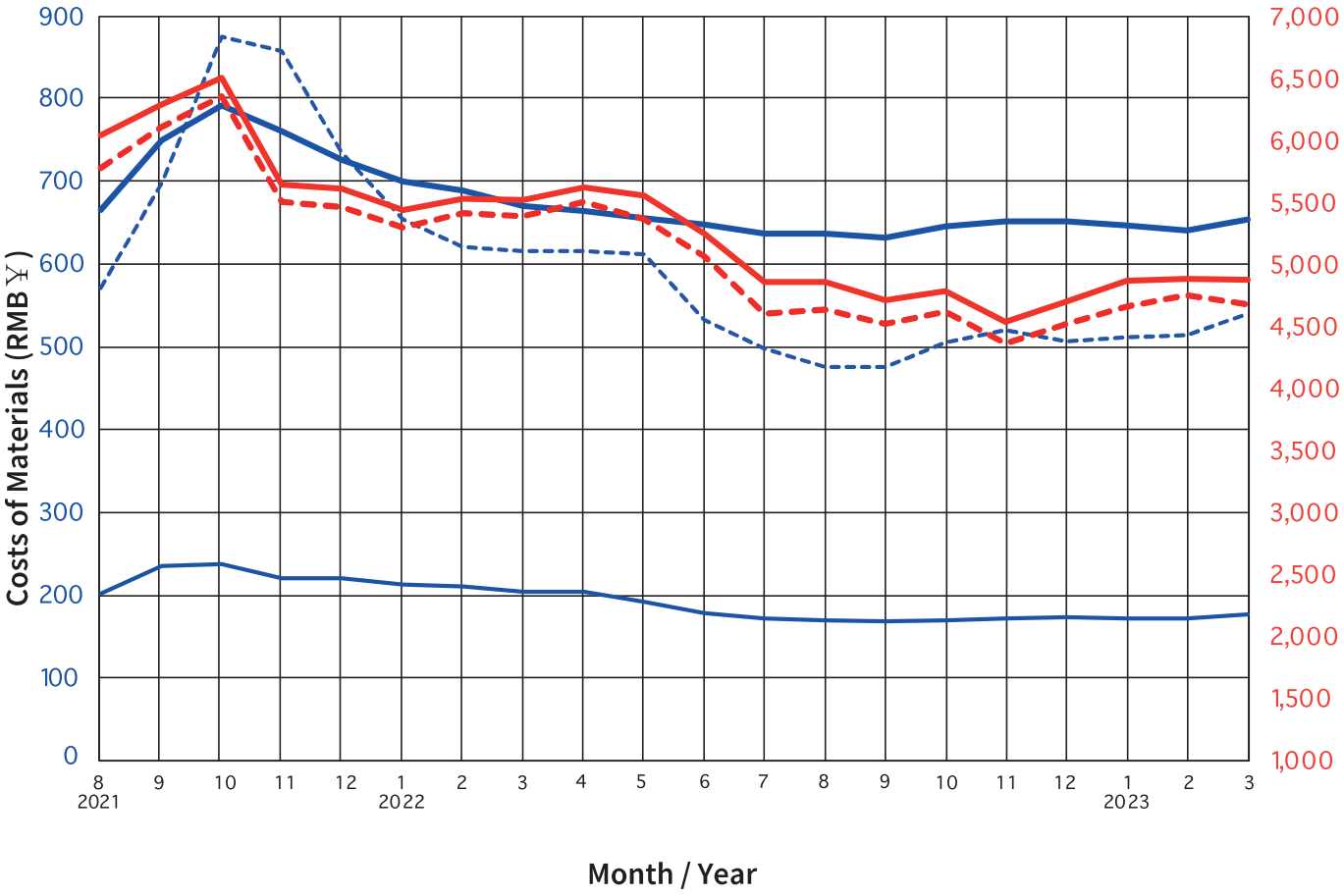


Building Materials			Wholesale Prices of Selected Building Materials in Shanghai																			
			2021					2022												2023		
			Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar
Reinforcement bar HPB235 (I) 10mm	¥/t	—	5,900	6,020	6,560	5,800	5,490	5,390	5,410	5,480	Not Issued		5,380	4,840	4,775	4,730	4,655	4,515	4,560	4,660	4,770	4,875
Reinforcement bar HRB400 (III) 25mm	¥/t	·····	5,480	5,590	6,150	5,420	5,110	5,080	5,100	5,190			5,000	4,450	4,320	4,350	4,300	4,105	4,135	4,320	4,420	4,515
Portland cement Grade 42.5 (bulk)	¥/t	·····	545	655	755	755	755	640	570	600			460	460	460	480	510	530	530	510	520	540
Reinforced concrete Grade C30 5-25mm aggregates P8 waterproofing (exclude pumping fee)	¥/m³	—	696	732	776	776	763	733	696	706			656	653	647	662	683	690	686	675	678	690
Sand (rough/mixed)	¥/t	—	207	207	214	214	207	207	204	204			202	198	195	199	203	203	201	199	195	198

Note: The price was not issued for April and May 2022, Since March 2022, Covid 19 Omicron variant has created pandemic in Shanghai. On 1st April, local government adopted lockdown policy which has been in effect through the end of May.

(Source: https://ciac.zjw.sh.gov.cn/)

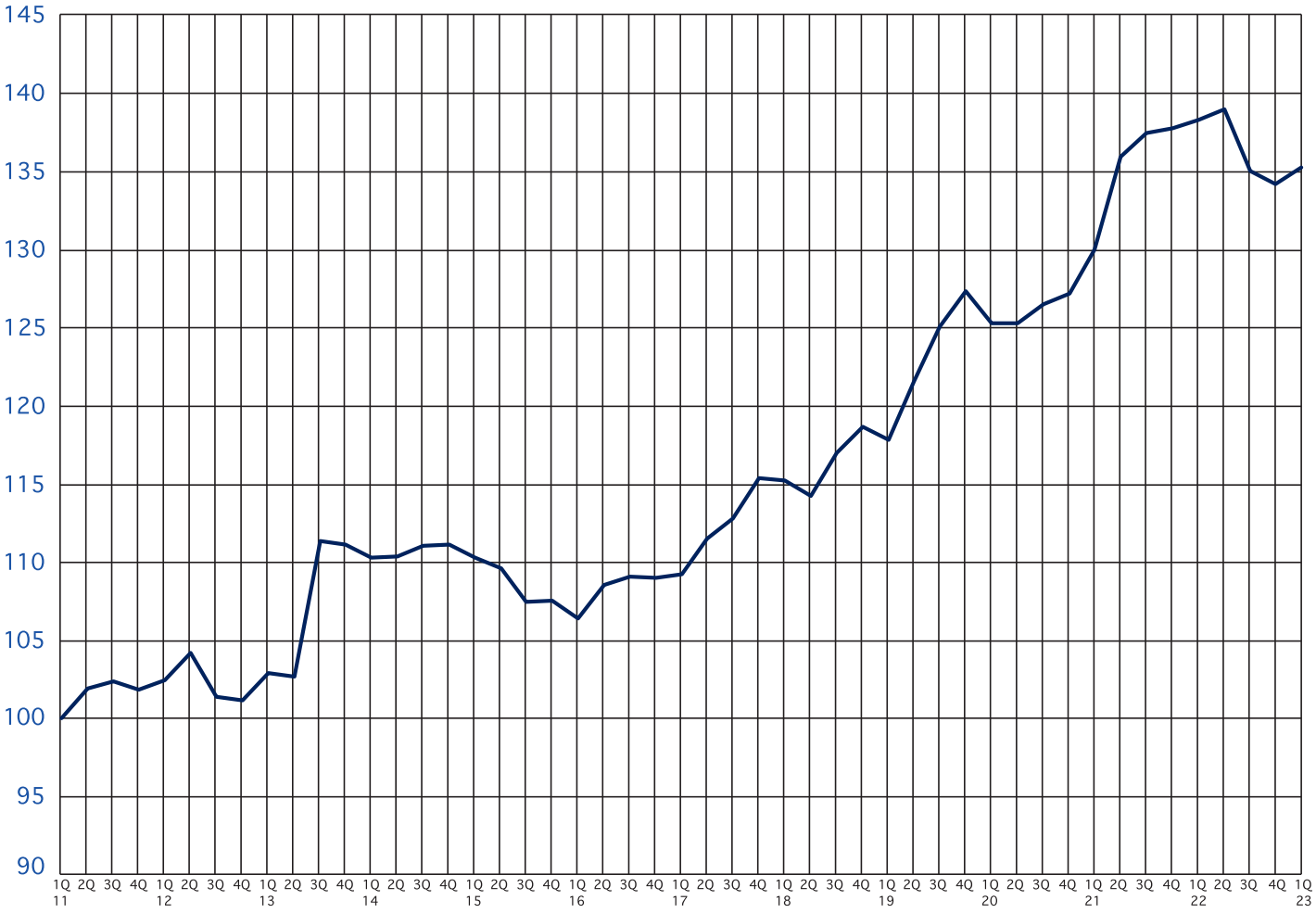
Wholesale Prices of Selected Building Materials in Shenzhen



Building Materials			Wholesale Prices of Selected Building Materials in Shenzhen																			
			2021					2022											2023			
			Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar
Reinforcement bar HPB235 (I) 10mm	¥/t	———	6,017	6,264	6,476	5,620	5,589	5,415	5,507	5,502	5,601	5,533	5,232	4,845	4,845	4,700	4,770	4,523	4,685	4,851	4,873	4,864
Reinforcement bar HRB400 (III) 25mm	¥/t	·····	5,755	6,079	6,331	5,482	5,441	5,280	5,392	5,369	5,480	5,348	5,053	4,587	4,620	4,506	4,609	4,354	4,511	4,647	4,739	4,664
Portland cement Grade 42.5 (bulk)	¥/t	·····	569	695	871	853	731	652	619	613	614	610	531	497	475	475	504	519	506	510	513	538
Reinforced concrete Grade C30 5-25mm aggregates P8 waterproofing (exclude pumping fee)	¥/m³	———	662	746	788	758	723	697	686	668	661	653	645	634	634	630	643	650	650	645	638	652
Sand (rough/mixed)	¥/t	———	203	236	239	221	221	214	212	206	206	193	179	174	171	170	171	174	174	173	173	178

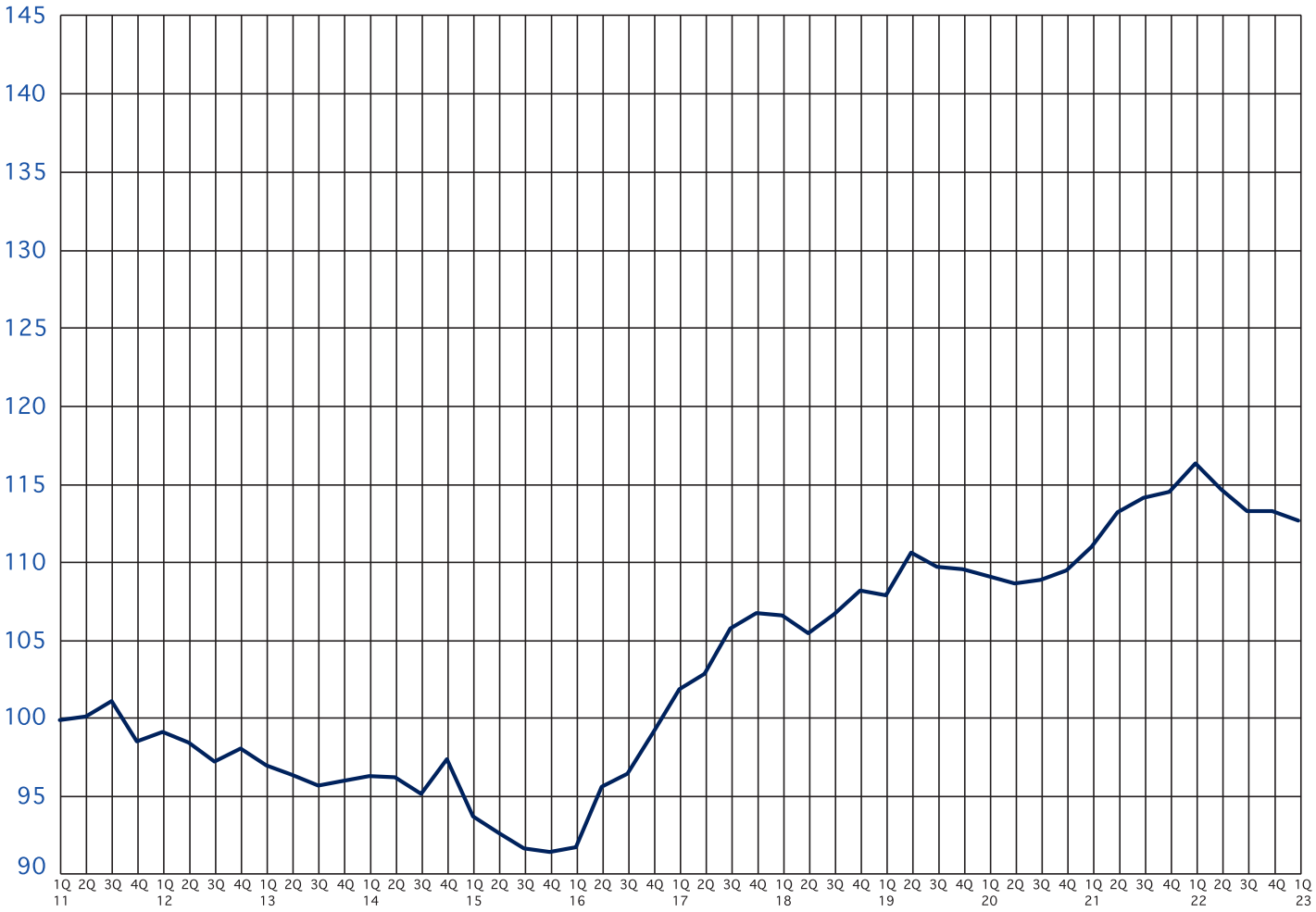
(Source: www.szcost.cn)

Construction Cost indices in Beijing



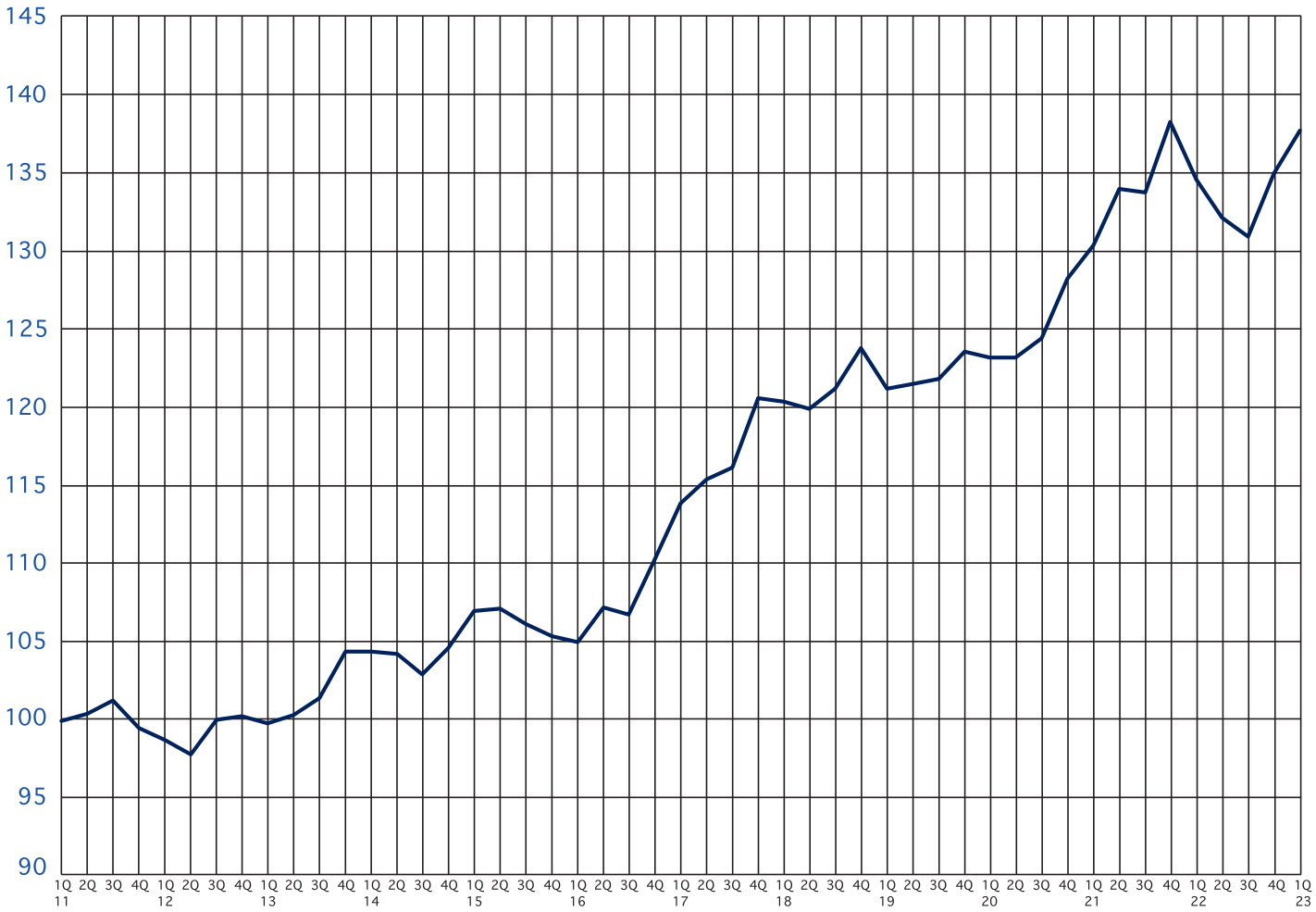
Quarter	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
1	100.00	102.41	102.86	110.31	110.35	106.41	109.21	115.32	117.90	125.38	130.11	138.45	135.37
2	101.88	104.19	102.64	110.43	109.61	108.56	111.55	114.29	121.61	125.42	136.13	139.18	
3	102.38	101.37	111.35	111.10	107.50	109.13	112.84	117.03	125.13	126.58	137.63	135.18	
4	101.81	101.13	111.19	111.12	107.57	109.03	115.45	118.74	127.44	127.33	137.92	134.34	

Construction Cost indices in Chengdu



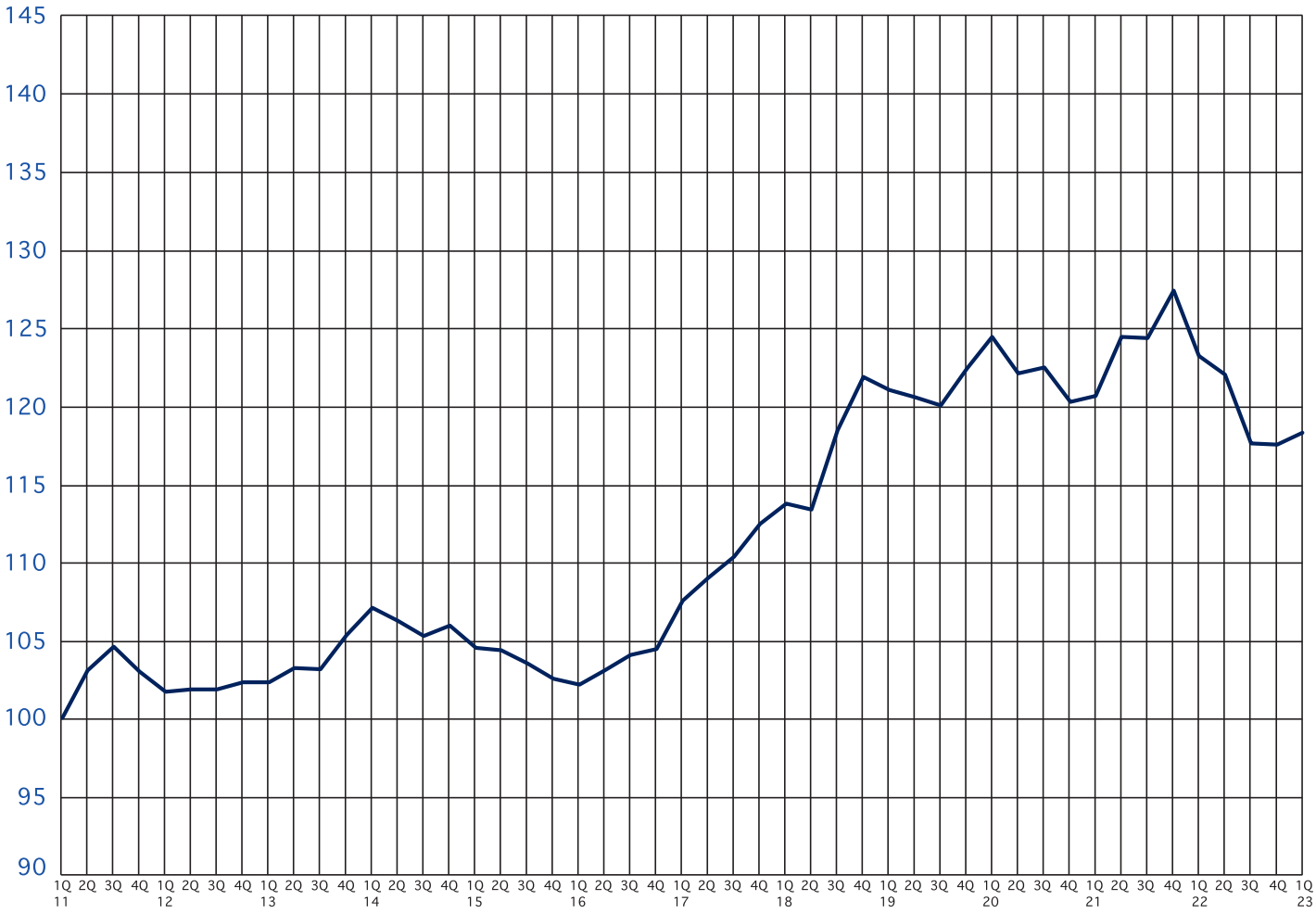
Quarter	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
1	100.00	99.25	97.12	96.41	93.77	91.77	101.95	106.69	108.01	109.28	111.16	116.52	112.87
2	100.21	98.55	96.48	96.34	92.69	95.71	103.00	105.56	110.75	108.77	113.36	114.83	
3	101.19	97.34	95.77	95.28	91.74	96.56	105.90	106.80	109.84	109.03	114.27	113.45	
4	98.63	98.19	96.11	97.50	91.49	99.21	106.84	108.29	109.67	109.66	114.70	113.43	

Construction Cost Indices in Shanghai



Quarter	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
1	100.00	98.73	99.87	104.44	107.03	105.02	113.90	120.43	121.23	123.28	130.41	134.66	137.77
2	100.45	97.84	100.40	104.24	107.20	107.24	115.43	119.96	121.55	123.22	134.02	132.21	
3	101.30	100.10	101.46	103.01	106.16	106.82	116.24	121.23	121.84	124.50	133.81	130.97	
4	99.52	100.31	104.44	104.64	105.42	110.29	120.63	123.87	123.59	128.32	138.30	135.04	

Construction Cost Indices in Shenzhen



Quarter	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
1	100.00	101.66	102.34	107.10	104.50	102.13	107.57	113.79	121.17	124.54	120.73	123.35	118.39
2	103.05	101.84	103.24	106.27	104.35	103.06	108.98	113.43	120.70	122.22	124.55	122.16	
3	104.58	101.87	103.16	105.29	103.50	104.06	110.39	118.53	120.16	122.59	124.48	117.67	
4	103.01	102.30	105.32	105.94	102.55	104.47	112.49	122.00	122.50	120.39	127.55	117.62	

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