

**For discussion
on 19 July 2024**

**Subcommittee to Study the Effectiveness, Costs and
Management of Public Works Projects**

**Overview of Hong Kong construction cost and
prevailing cost management measures**

Purpose

This paper briefs Members on the overview of Hong Kong construction works, approval process of public works and prevailing cost management measures.

Background

2. Over the years, the Government of the Hong Kong Special Administrative Region has been continuously developing infrastructure to promote economic development, improve people's living environment, create job opportunities, attract talents and enhance Hong Kong's long-term competitiveness. However, as the construction volume continues to grow, the construction industry also encounters many challenges, including the ageing workforce, manpower shortage, declining productivity and site safety performance, which has put the construction industry's capacity under test. In addition, we are also facing the issue of high construction costs. In fact, Hong Kong has once ranked top three¹ globally in the International Construction Cost Index² over the last decade.

3. The Development Bureau (DEVB) has always been concerned about the issue of construction costs, and cost control of public works has all along been one of our key areas of work. Over the past few years, the DEVB has launched a

¹ Between 2016 and 2020, Hong Kong was ranked in the top three globally.

² The International Construction Cost Index published by an international renowned construction consultancy firm, Arcadis, is compiled based on the construction costs of different building types such as school, residential, hotel, office, etc. across 100 major cities worldwide each year. The index fully reflects the annual change in the construction costs in these cities, and the ranking is arranged based on the values of the indices with the highest at the top of the list.

number of strategic measures, including the implementation of “Construction 2.0” since 2018 to drive industry enhancement in collaboration with the construction sector. Under this initiative, industry practitioners are encouraged to adopt advanced construction technologies to uplift the productivity, capacity and sustainability of the construction industry, in order to address the challenges the industry is currently facing. Objectively speaking, Hong Kong has a relatively high standard of living and at the same time being one of the most densely developed cities in the world. This, coupled with the complex geographical conditions, has resulted in high construction costs. Nevertheless, thanks to the concerted efforts of industry stakeholders, Hong Kong’s ranking in the International Construction Cost Index 2024 has dropped to the ninth position. Despite the downward adjustment in the global ranking of our construction costs, Hong Kong remains the city with the highest construction costs in Asia. In this connection, the DEVB is conducting a strategic study with a view to identifying the major reasons for the high construction costs and formulate strategic measures to control construction cost.

Overview of Hong Kong construction works

Capital works expenditure

4. The capital works expenditure for 2023-24 financial year was about \$85 billion, and we expect that the total estimated capital works expenditure for 2024-25 financial year will be about \$90 billion³. In the coming five years, we expect that the average annual capital works expenditure will be maintained at the level of about \$90 billion. This figure represents an increase of about 17 per cent over the average annual expenditure of \$76 billion in the last five years, which demonstrates the Government’s continued allocation of resources for capital works projects with a view to improving the living environment of the people, promoting economic growth and enhancing the long-term competitiveness of Hong Kong.

³ Counting also other public organisations, such as Housing Authority, Airport Authority, Mass Transit Railway Corporation, and private organisations, the overall construction volume of Hong Kong in 2024-25 will be about \$250 billion.

Construction cost trends

5. The overall wages of the major trades of construction workers⁴ in the last ten years have been on an upward trend, with increases ranging from of 15 per cent to 40 per cent. The overall increase of the wages of construction workers is similar to those of other non-supervisory trades over the same period⁵. The wages of construction workers has been changing mainly in accordance with the adjustment of Hong Kong living standard.

6. There has been a significant increase in major construction material⁶ cost over the decade, in a range of 20 per cent to 70 per cent. The trend of increase in construction material costs in Hong Kong is broadly similar to that in other neighbouring cities⁷. The change of material cost is mainly due to global demand and supply situation. The costs of the major construction materials had a steady increase between 2014 and 2020, followed by a substantial increase between 2020 and 2022. Since 2022, the costs of the major construction materials have shown a steady or general downward trend.

Trend of Works Tender Price Index

7. The Works Tender Price Index is calculated based on the principle of tracking the percentage change in the price of a basket of items⁸ of specific projects over time. Apart from reflecting the tendering trend of contractors, it also helps the bureaux to understand the market situation so as to formulate relevant strategies. In the past 10 years, the Civil Engineering Works Tender Price Index⁹ and Building Works Tender Price Index¹⁰ have reached their peaks in 2015 and 2016 respectively. The indexes dropped since then and picked up the rising trend again from 2021 onwards. In summary, the changes in the tender price indexes reflects that, in addition to workers' wages and material costs, there are also other factors, such as overall construction volume, global economic environment, market prospects, company strategies, operational costs, profits,

⁴ Major trades of construction workers include bar bender and fixer, carpenter (formwork), concreter, plant and equipment operator, general worker and odd-job worker.

⁵ In past 10 years, the wages increase for non-supervisory trades such as chef, waiter, driver, security officer etc. is in a range of 15 per cent to 35 per cent.

⁶ Major construction materials include cement, galvanised mild steel, diesel fuel, aggregates and steel reinforcement.

⁷ Nearby regions include Singapore, Macau, Shanghai, Guangzhou, Shenzhen etc.

⁸ The basket of prices cover more than 200 projects with items including concrete, reinforcement, bitumen etc.

⁹ Civil Engineering Works Tender Price Index is a quarterly index for reference of cost estimation exercises by various government works departments. It is compiled from tender pricing data of major types of civil engineering works undertaken by various government works departments.

¹⁰ Building Works Tender Price Index (BWTPI) is a quarterly index compiled by the Architectural Services Department as an aid to adjust building cost data for estimating purposes.

risks etc. In 2024, the trend of both Civil Engineering Works Tender Price Index and Building Works Tender Price Index remain generally stable.

Manpower demand of the construction industry

8. According to the Manpower Forecast released by the Construction Industry Council (CIC) in February 2023, the construction sector will be short of manpower of skilled workers, technicians and professionals in future, with the shortage expected to exceed 40 000 people by 2027. To address the manpower demand of the industry, we have been adopting multi-pronged measures, including enhancing the training of local manpower, recruiting new blood to join the industry, and promoting the application of technologies by the sector to uplift the overall productivity of the construction industry and reduce manpower shortage. On the premises of safeguarding employment priority for local labour, the "Labour Importation Scheme for the Construction Sector" serves as a supplementary measure to alleviate the manpower shortage of the sector.

9. On professionals, considering the number of local university graduates in the relevant professions is insufficient to address the problem of manpower shortage, the DEVB, under the premise of safeguarding the employment priority for local talent, has conducted recruitment activities at various overseas and Mainland universities in collaboration with local construction engineering enterprises since 2023. During the recruitment activities, the development of Hong Kong' s construction industry as well as the opportunities that the industry can offer have been introduced to the university students from the construction engineering and relevant disciplines so as to attract them to pursue their careers in Hong Kong, with a view to alleviating the shortage of local construction professionals.

10. On resident site supervisory staff, consultants will work out the proposed establishment of resident site staff (RSS) having regard to factors such as the scale and complexity of a construction project so that the project will be managed effectively and properly. The duties of RSS generally include contract management and construction supervision, with a view to ensuring that site safety as well as the quality and progress of works are in compliance with the requirements. The proposed establishment will be submitted for approval by the managing department. Subsequently, consultants will employ the relevant RSS in stages according to the RSS establishment approved by the managing department and the progress of works.

Adoption of innovative construction methods and advanced technology

11. We seek to enhance productivity and efficiency by taking forward strategic initiatives, such as promoting the wider adoption of high productivity construction like Modular Integrated Construction (MiC) and Multi-trade Integrated Mechanical, Electrical and Plumbing (MiMEP), as well as new construction materials, and digitalisation of the public works projects. Taking digitalisation of public works as an example, we have established an inter-departmental task force to lead and drive the application of digital technology in public works projects throughout the whole project life cycle. Examples include adoption of Digital Works Supervision System (DWSS) in public works contracts, the Building Information Modelling (BIM), Smart Site Safety System (4S) etc., which enable the project management team to monitor the real-time project progress and performance with a view to uplifting management efficiency of public works, thereby controlling project costs and enhancing site safety in a better manner.

Prevailing approval process of public works projects

Project design and approval process

12. After project initiation, public works projects need to go through design, public consultation, tendering etc. Approvals in respect of planning, environmental protection etc., are required for some projects. When the planning and design of the project has been substantially completed, the policy bureau concerned will further consult the relevant Legislative Council (LegCo) Panel before the project is submitted to the Public Works Subcommittee (PWSC) for consideration and, ultimately, the Finance Committee (FC) for funding approval for its implementation. Apart from seeking funding approval from the FC, subvented projects, such as some hospitals, hostels and schools, are also required to submit building plans to the Buildings Department (BD) in accordance with the provisions of the Buildings Ordinance and the Subsidiary Regulations, and can only commence construction after obtaining approval and consent from the BD.

Project estimate

13. Generally speaking, a rough estimate of the construction cost of a public works project will be made at its inception stage, and a realistic project estimate will be worked out after the detailed design is substantially completed. The project estimate for a public works project includes the construction cost, ground investigation cost, consultancy fee, site supervision cost of Resident Site Staff (RSS), project contingency and provision for price adjustment, etc. When estimating the construction cost, the project team will not only refer to the costs of other similar projects (e.g. tender prices of recently awarded contracts of similar nature and unit cost of similar types of work) and the latest market situation etc., but also consider the nature, uniqueness, difficulty, and complexity of the project itself to ensure that the cost estimate is reasonable. Consultancy fees cover the costs of feasibility studies, design, tendering, and supervision of site investigation works. The cost of site supervision by RSS includes the expenditures for hiring professional, technical, and other related personnel. There is a set of stringent mechanisms for vetting project estimates. Works departments have established dedicated committees to examine whether the cost estimate of each public works project is reasonable.

14. At the same time, the Project Strategy and Governance Office (PSGO) of DEVB¹¹ will act as an independent third party and participate in project cost vetting starting from project inception stage, and will assist works departments to optimise the project design, such as foundation works, building layout, etc. under the principles of “fitness-for purpose” and “no frill” to reduce construction cost of the projects. The PSGO will also collaborate with bureaux and works departments of the projects concerned to formulate and implement practicable alternatives, with a view to controlling the overall construction costs of the projects.

Procedures of Tender Invitation and Evaluation

15. The Government has been adopting the principles of "achieving best value for money" and "maintaining open and fair competition" for the procurement of public works contracts with clear guidelines and procedures set out for tender invitations and evaluations. We normally adopt "two-envelope two-stage" approach in tendering. Tenderers are required to submit technical

¹¹ In order to effectively uplifting cost effectiveness, the then Project Cost Management Office (PCMO) was established under DEVB in 2016 and was upgraded to the Project Strategy and Governance Office (PSGO) in April 2019.

proposals and price proposals separately to works departments. During tender evaluation, we will firstly assess tenderer's technical competence and past performance, followed by considering their tender prices. Finally, a combined score for each of the tenders will be derived. Depending on the complexity of the works, the weightings of a tender's scores on technical aspects against the overall score are 63 per cent to 72 per cent for consultancy agreements, and 40 per cent to 50 per cent for works contracts. The tender with the highest combined score will normally be accepted. To prevent tenderers from submitting unreasonably low bids to win the bids, we have put in place a mechanism to exclude tenders with unreasonably low bids. This will avoid contract default or other risks due to inadequate tender prices.

Provision of information on public works projects

16. Funding applications submitted to the Legislative Council for works projects will list clearly the project proposal, project scope and nature, justification, financial implications, etc. In addition to the total project cost, the applications will also present a breakdown of the project estimate, the cash flow and the estimated additional recurrent expenditure. To provide more information on project cost estimates for Members' reference when considering the applications concerned, for complex and mega-projects, the Government will list in the funding applications submitted the unit costs of major works items of the proposed works projects and the unit cost range of works items of other past projects of similar scale and nature for Members' information.

Prevailing cost management measures of public works

17. There is a set of stringent and effective cost management measures for implementation of public works projects. The implementation of works projects is under the joint control of the Financial Services and the Treasury Bureau (FSTB) and the DEVB. In a nutshell, the FSTB is mainly responsible for monitoring the fiscal sustainability of Capital Works Programme (CWP), formulating the Capital Works Reserve Fund estimates and vetting the capital works resource allocation, with a view to setting priorities for projects. The FSTB is also responsible for handling matters related to seeking LegCo's funding approval for public works projects. The DEVB is responsible for overseeing the formulation and delivery of works projects, vetting project estimates, chairing the dedicated committees comprising heads of works departments and monitoring the works progress and expenditure position. In recent years, the DEVB has promulgated series of cost management measures, including:

Adoption of the New Engineering Contract (NEC) form

18. In 2009, the DEVB piloted the first public works contract in the NEC form. From 2009 to now, there have been over 620 public works contracts adopting the NEC form with a total value of over HK\$400 billion, of which approximately 100 works contracts have been completed with the accounts finalised. The ratio of NEC contracts to all public works contracts has been increasing over the years, from 22 per cent in 2017 to 75 per cent in 2023. 100 per cent of the large-scale capital works projects commenced in 2023 have adopted the NEC form. Summing up our experience over the past years, the NEC form has an advantage over the conventional contract form in terms of risk and claim management, which can help enhance project cost effectiveness, including reducing the risk of project cost overrun or delay. In addition, we encourage the wider adoption of the NEC target contract option for projects with higher risk level. This option provides a risk sharing mechanism and adopts a cost reimbursement payment approach. When the actual construction cost is lower than the target cost, the contractor can share the cost saving with the client; when the actual construction expenditure exceeds the target cost, the client will bear the difference together with the contractor. This mechanism provides incentives for the contractor to carry out the works in a more cost-effective manner, aiming to reduce unnecessary expenses. It also helps reduce the risk premium that the contractor would have allowed for in their bid, as well as strengthen the management of project cost. .

Construction stage monitoring

19. Since 2018, we have deployed the Project Surveillance System (PSS)¹² to monitor the performance of projects on a continuous basis and provide predictive analyses for forecasting the costs and time performances of on-going projects. The PSS aims at assisting works departments foresee challenges or potential problems of on-going projects during construction stage and providing early warning signals to the senior management for necessary early intervention. At the same time, the PSGO also examines major variations that arise during the construction period to ensure cost effectiveness.

¹² The Project Surveillance System consolidates and makes use of data of about 600 projects in Hong Kong over the past 20 years, and analyses project expenditures and time performance, with a view to providing early warning signals for monitoring project progress.

Adoption of parallel tendering

20. Starting from September 2020, parallel tendering has to be adopted as far as practicable for the procurement of all works contracts and works-related consultancies. The objective is to reflect the returned tender price in the Approved Project Estimate (APE), so that the project can be better managed financially to reduce the risk of cost overrun. It can also avoid unnecessary lock-up of internal resources, as that may affect the implementation of other projects. In addition, this arrangement can facilitate early project commencement after obtaining funding approval from the FC of LegCo

Preliminary achievement of cost management measures

21. Apart from scrutinising the estimates of public works projects, the PSGO also implements strategic measures to strengthen project governance comprehensively. Since its establishment, the PSGO (and PCMO) collaborated with works departments and relevant stakeholders and has scrutinised more than 540 public works projects that have to seek funding approval from the FC of LegCo, and successfully identified cost saving of more than \$190 billion from the total original project estimates of \$1,200 billion. Majority of these projects have successfully commenced with some of them having the construction completed. We are confident that there will be no substantial cost and schedule overrun of these projects.

Overall performance of public works

22. The cost and time management performance of the CWP has all along been well performed and additional funding is required only for a small amount of projects. In the ten legislative sessions from 2013-2014 to 2023, the FC approved a total of about 550 Category A projects with total funding of about \$970 billion. Only 3 per cent of them, i.e. 16 projects, had to seek FC approval for increase in APE, involving about 6 per cent of the total funding, which is \$57.1 billion.

23. Although some projects needed to seek supplementary provisions as a result of certain circumstances, overall speaking, not only did we complete the projects under the CWP within their original APEs, we also managed to secure a surplus. There were 534 Category A projects with their final accounts settled in the past ten legislative sessions, and while the original APEs totalled about \$172 billion, the total final expenditure was about \$153 billion. Despite the fact that some projects needed to seek increase in APE from the FC, the surpluses

from other projects were enough to offset the cost overruns, with a balance of about \$19 billion. In other words, the total expenditure for all these projects, including supplementary provisions, only accounted for about 90 per cent of the total original APEs.

24. As a matter of fact, the performance of Hong Kong's public works projects is better than other regions. Prof Bent FLYVBJERG of the University of Oxford has compared the performance of Hong Kong's public works projects with that of the works projects in other places such as Canada, Denmark, the Netherlands, Sweden and the United Kingdom. The findings indicate that our mechanism for delivering public works projects and cost-control measures are better than those of other places, and thus the probability of Hong Kong's public works projects experiencing cost overruns is far lower than that of other places.

Construction cost study

25. As mentioned above, we are conducting a strategic study to compare the construction costs of different project types between Hong Kong and other major cities, and will make reference to Mainland and overseas systems to have an in-depth understanding of the fundamentals of construction costs. We will conduct a comprehensive review of the procurement approach, consultancy studies, technology application, approval and workflow.

26. We will give an account of the study progress at the coming subcommittee meeting, and will discuss and exchange views with Members on relevant measures for controlling the costs of public works projects.

27. Members are invited to note the content of this paper as a reference for detailed discussion in the coming meetings of the sub-committee.

Development Bureau
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