RAILWAY PROJECT COST SYSTEM OPTIMIZATION BASED ON CHINESE HIGH-SPEED RAILWAY CONSTRUCTION

Li Chengdong

Railway Project Ration Institute
Address: Haidian District, Beijing, Yang fang dian Road No. 8,
Institute of Economic Research, the Ministry of Railways.
LCDTLGC@sina.com

ABSTRACT

In recent years, with high-speed railway network under construction in full swing in China, the railway has ushered in a golden opportunity for its development, thus starting a rapid development period of railway construction and making a new requirement of the Railway Project Cost System (RPCS). This paper analyzes the characteristics of construction of China's high-speed railway network, starting with how RPCS that was built up gradually provides service to high-speed railway network in China, and then describing the principles of the new system configuration, its main components and major changes. It proposes measures for perfection on how the railway project cost system can further adapt to high-speed railway network construction and operate under good conditions, for further perfecting the railway project cost system, for highlighting the targets and time effectiveness of the cost standard, for reducing the sub-index of the rating and appropriately integrating materials, for perfecting the publishing mechanism of prices, for issuing prices in accordance with guided price and market price respectively and for acceleration of the construction of railway project cost management information system and the release of comprehensive price index in time.The construction of a state-of-the-art railway network is an important guarantee to construct a harmonious society. According to “The CR Medium- and Long-term Network Program”, the Ministry of Railways (MOR) has decided to focus on developing passenger dedicated railway lines (PDL) on a large scale, which has higher requirements of RPCS. Based on the tenet of "being scientific and rational, practical and realistic” and guided by such ideas as "open and stable preparation methodology, dynamic management of project cost, in-time release of price information, and effective linking of the front-end work with the rear-end work", the management will gradually build up a railway project cost standard system. This provides a powerful guarantee for the effective control of project investment and a reasonable pricing of project cost for railway network construction.

Key Words: Project Cost; System; High-speed rail network

1. INTRODUCTION TO “THE CR MEDIUM- AND LONG-TERM NETWORK PROGRAM”

Due to the difficulty of making changes once it is built, the permanent transportation infrastructure should be developed moderately ahead of the present needs. Problems hindering the decision-making are mainly sourced to railway infrastructure construction. The population in China is big, but is concentrated in locations, thus the passenger transportation becomes the key of railway transport. Therefore, we should construct PDLs on a large scale.

1.1 Target of railway network development

In order to hit the goal of comprehensively constructing a well-off society, the railway network should expand its size, improve its structure, enhance its quality, rapidly expand its transport capacity, and promote its equipment level. By 2020, the mileages will expand to a length of over 120,000 km, with its passenger traffic and freight traffic separated on its busy trunk lines on a rational system layout, with a clear structure, perfect functions and smooth connections. The capacity of transport will meet the needs of

the national economic and social development and the main technical equipment will be at or near the international advanced level.

1.2 According to statistics, the investment in fixed assets has realized about 414.4 billion Yuan in 2008, an increase of about 62 percent over 2007. The railway construction is found in an unprecedently fast development period.

1.3 PDLs

To meet the fast-growing demand of passenger transport and build high-speed passenger traffic corridors between different capital cities, it has been planned to build 8 PDLs and some Inter-city passenger transport systems in economically developed and densely populated areas. PDLs of over 16,000 km will be built.

(1) Four north-south PDLs: including Beijing-Shanghai, Beijing –Wuhan –Guangzhou -Shenzhen, Beijing-Shenyang –Harbin (Dalian) , Shanghai- Hangzhou- Ningbo –Fuzhou - Shenzhen ;

(2) Four east-west PDLs: Xuzhou-Zhengzhou–Lanzhou, Hangzhou-Nanchang-Changsha, Guiyang-Kunming, Qingdao-Shijiazhuang-Taiyuan, Nanjing-Wuhan-Chongqing-Chengdu;

At the same time, other PDLs will be built such as Nanchang-Jiujiang, Liuzhou-Nanning, Mianyang-Chengdu-Leshan, Harbin-Qiqihar, Harbin-Mudanjiang, Changchun-Jilin and Shenyang-Dandong, the coverage of PDLs will be greatly expanded.

(3) Inter-city passenger transport systems

We have planned to construct inter-city passenger transport systems in areas that are economically developed and densely populated, such as Bohai sea, Yangtze river delta and Pearl river delta, city groups of Changsha-Zhuzhou-Xiangtan, Chengdu-Chongqing, mid-China city groups of Wuhan city ring, Guanzhong city and town cluster, and the city and town group along the west coast of the Taiwan Strait, thus covering all cities and towns in these areas.

2. CURRENT CHARACTERISTICS OF RAILWAY CONSTRUCTION

Work will focus on passenger traffic transport and the rationality of the network structure in the next period of time. The passenger traffic demand being a basic one, must be met. The key of network plan in China is to build PDLs of 16,000 km. There are several reasons for this. The population of China is huge, the demands of passenger traffic tremendous, the supply inadequate, and the passenger traffic pkm has much to be desired to keep pace with the economic growth and the rising of the people's living standard. To make more investment in rail infrastructure can not only ensure the people's livelihood and the basic needs of security, but also activate the market. For example, in the process of building Beijing-Shanghai railway, the daily construction investment is 190 million yuan, the average daily consumption of steel about 10,000 tons and the average daily consumption of cement about 3,500 tons, thus promoting the economic development and the effect is tremendous. The new high-speed railway construction standard has changed greatly as compared with the original one, which are described as follows:

2.1 The designed train speed increased significantly

Increased train speed is an important indicator of construction and development of modern railways. Currently, we have completed such railway lines of 250 km/h as Suining-Chongqing line, Shijiazhuang-Taiyuan line, Hefei-Wuhan line and Hefe-Nanjing line. Beijing-Tianjin inter-city railway enjoys a speed of 350 km/h. With the above railways constructed, the railway will cause a revolutionary impact on the people's habits of making trips. For example, it will take less than 30 minutes to ride the Beijing-Tianjin inter-city railway to travel from one city to the other, impressing people like living in one and the same city.

The PDLs of Hefei–Wuhan and Hefei-Nanjing constitute the shortest path between Yangtze River delta and the central-south area, promoting economic and social development of the two areas. It takes only four hours and 45 minutes to get to Shanghai from Hankou, saving 4 hours 40 minutes.

2.2 The standards of way infrastructure improved significantly

It is the first time for introducing classified precision control measure to the way survey to meet the demand of high level of track regularity. At the same time, we have strengthened the track structure and widely adopted ballastless track, taken the concept of stiffness and riding quality in bridge design, and improved the standard of tunnel waterproof.

3. HIGH-SPEED RAIL NETWORK CONSTRUCTION HAS NEW COST REQUIREMENTS

3.1 Strict control of investment level

We must tighten the investment control, enhance the conservation awareness, strictly control the project components and scale, and fully exploit the investment benefit.

3.2 Dynamic control of material price.

The information of material price is the basis for making and reviewing the budget and the key for investment control. The changes of price currently is dramatic at material market. The difference of price among many local markets is dramatic. So cost management should publish the price information timely and accurately.

3.3 Rate of charges and rating should vary with railway construction standards and be supplemented and improved timely. Many new technologies including new equipment and new materials are widely used while the construction of the passenger dedicated lines is going on in full swing. The work of fixing the rate should keep pace with it and strengthen technology reservation at the same time.

4. WAYS OF GETTING RPCS ADAPTED TO HIGH-SPEED RAILWAY CONSTRUCTION

4.1. RPCS Characteristics

The main features of railway construction are long in time, huge in investment and complex in construction and management. The management of railway project cost is the core of construction and management of railway in the entire process of project construction. In recent years, the railway construction market is standardized and in good order, all due to the fact that there are scientific and rational criteria that ensures construction cost.

4.2. Significant changes of new cost system

(1) Preparation methodology open and stable
The open and stable methodology is an effective means to meet the needs of rail network planning and construction. The cost component and standard must keep stable in a certain period and be supplimented per needs of market. It should take full account of new issues of cost standards, find solutions, release the cost setting qualifications timely, and provide an important basis for the High-speed railway network construction.

(2) Dynamic management of the project rating
In order to follow the rapidly changing markets, the project rating must be managed in a dynamic way. At present, new technologies, new processes and new methodologies are emerging, greatly impacting on project cost. We should have a comprehensive understanding and evaluation of the

situation of the site, and make in-time supplimentation so as to meet the needs of railway construction. The cost management has issued many copies of supplemented ratings according to the needs of constructing the high speed railway network.

(3) In-time release of price information
Under the current conditions of building railway net on a large scale, the railway construction cost system will open up all its main material prices. The cost of the main engineering materials accounts for over 90% of total. The major materials use the market prices, while other materials the prices promulgated by the Ministry of Railways. At the same time, the MOR promulgated price will be adjusted with supplementary material price difference coefficients set by MOR in order to keep the material price in line with the market.

(4) Realization of whole-process cost management based on three phases - "policy making phase, project transaction phase, and project implementation phase"
Project cost control breaks down into three phases: decision-making phase; transaction phase; and implementation phase. In the preliminary phase it is a decision-making stage before the start of the project. It is used for the approval of the project by the government and for MOR to determine the final investment. The project cost and designed budget is the basis of policy making for the government and the owner. In the implementation phase, it is to determine the eventual price during the implementation of the project. Between the two phases is the transaction phase, which is short, but important. In the whole process of project construction cost management, it is the key to link up pre-construction decision-making and the rear-end eventual price. The focus point of the project cost standard lies in the pre-construction period, i.e. preparation methodology and project rating setting. Only by doing a good job of these two things can we have an effective linking of the phases.

4.3 Role of RPCS

The main function of the RPCS is to control investment, save construction funds, improve investment returns and achieve low-cost expansion of the railway. At the same time, it can strengthen the contact of construction units with design units, and can gain the latest development trend of key projects, thus laying a sound foundation for railway construction.

5. WAYS OF POSITIVELY OPERATING RPCS

According to the problems propped up in application, the system should be further perfected in the following aspects:

5.1 The material prices should be divided into a guided price and a market price. The guided price issuing unit has the right of interpretation while the market price will be provided and issued by the manufacturer.

5.2 Speed up the construction of railway project cost management information system

We should speed up the construction of railway engineering cost database, and make the database play a role in investment control. We also should strengthen contact with the manufacturer, obtain price information of the construction site, pay close attention to all major material price changes, and release the price information on the information network of railway project cost timely and accurately .

6. CONCLUSIONS

Aimed at building a standard railway project cost system, which is easy to use and have a complete structure and wide coverage, we should further perfect the system, include achievements of the High-speed railway network construction, and lay a solid foundation for the Chinese high speed railway net construction.

REFERENCES

WU Mingyou, Mi Long,Speed up Establishing New Construction Technology Standard Systems for Railway Construction in China[J] JOURNAL OF RA ILWAY ENGINEER ING SOCIETY, 2007(11):84-88.

Economic Planning Institute of Ministry of Railways, Railway projects to improve the standard cost system ,Solid foundation for the railway construction investment control [J] Harmonious railway construction2007(4):39-42.