

## Analysis of Urban Rail Transit Operation Cost Control<sup>1</sup>

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### **Abstract**

*Analysis and research the composition of urban rail transit operation cost, putting forward the main influence factors affecting operating costs, also come up with some advice on operation cost control measures.*

**Keywords:** urban rail transit; operation cost; control

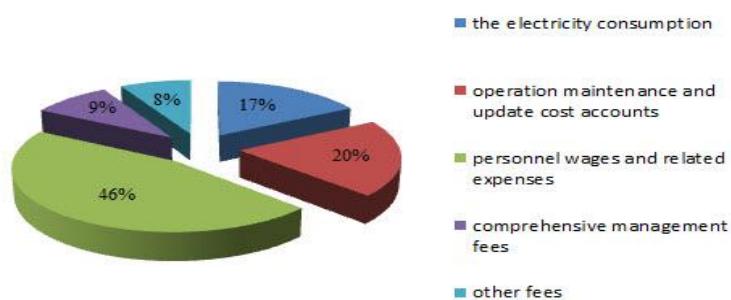
### **1. Introduction**

In recent years, the speed of urban rail transit construction in China, the new line mileage increase rapidly. Due to the urban rail transit is a public welfare facility, urban rail transit mainly rely on government subsidies and support to maintain operations all around the world. Huge annual maintenance charge has become a huge burden for government spending. Therefore, how to control of urban rail transit operation cost reasonably has become an important subject.

### **2. The composition of urban rail transit operation cost**

Urban rail transit operating costs include: all kinds of energy to produce electricity, update and maintenance fees of equipment system and infrastructure, personnel wages and related expenses, comprehensive management fees, etc.

**Average operating costs of Changchun  
urban rail transit**



**Fig.1 Average operating costs of Changchun urban rail transit**

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Take Changchun for example (Fig.1), personnel wages and related fees accounted for about 46%, operation maintenance and update

- (1) Power consumption in the form of electricity in operation. Mainly comes from vehicle traction, power lighting, ventilation and air conditioning energy consumption, etc.
- (2) Update and maintenance fees of equipment system and infrastructure. Mainly includes the depreciation and update fees of equipment system, infrastructure vehicles, and maintenance costs of vehicle and equipment. Among them, renovation costs of equipment system, infrastructure, vehicles and other takes up a considerable proportion.
- (3) Comprehensive management fees. Mainly includes office expenses and travel expenses of operational people, advertising and general publicity expenses. This amount has a high flexibility with wider range of fluctuation. If there were no management system constraints for related fees, it is easy to cause the abuse of enterprise management fees. Then, bring trouble to reasonable operating costs control .
- (4) Staff salary and welfare spending. Mainly depends on the number of employees, job allocation, wage level and other factors. For rail transit operation management department, such spending belongs to the rigid spending. The control potential is limited, however, artificial cost proportion in the total operation cost is very high.

### **3. The problems existing in the operation cost control process**

- (1) Weak operating cost management consciousness. Enterprise cost management now staying in the surface analysis and administrative management. Furthermore, operators only care about whether a cost index is overweight, and employees just to complete the cost control target, fundamentally lack of initiative.
- (2) The current urban rail transit construction management and operation system, investors, planning party, designers, project owners, operators, respectively manage by different professional company in most cases. It is hard to overcome the current situation where have more work interface and work respectively. Thus, managers cannot optimize the investment comprehensively from planning, construction and operation, constraining the cost control.
- (3) Most rail transit projects blindly improve the standard of equipment selection during construction period, purchasing and set up a lot of unnecessary large machinery, equipment. Therefore, the expense of later maintenance vacancy is very high.
- (4) Equipment and infrastructure renovation lack of long-term and effective planning. Frequent equipment renewal and infrastructure reconstruction makes the operation and maintenance cost increase greatly. As automatic fare collection system in one city just a few years has been the overall upgrade 3 times. Equipment update expense is huge.

### **4. Improve the measures of operation control**

#### **4.1 Establish budget system**

Build budget system, and strengthen the flexible control and rigid constraint of budget. According to the budget quota, disassembly decomposing and distributing all relevant fees, until the end cost center (such as the most grass-roots team, personnel, etc.),According to the principle of centralized leadership and decentralized administration, gradually establishing a "company quota--department quota--workshop quota--team quota" network system. In addition, constrain and control employees who use this fund ultimately saving and reasonably using money. To do a good job of decomposition and allocation, it is necessary to fully study process of rail transit operation, and establish a cost accounting system. Then, record and count the actual situation of general expense on time.

#### **4.2 Reduce labor costs**

Relevant fees of staff wages and welfare represent more than half of urban rail transit operation cost, even more. Therefore, company should cut off the overstuffed offices, and establish a scientific and reasonable employment mechanism, reducing operational management cost. For example, for simple work, can be used by workers; for technology specialized work could be outsourced to those professional companies; for underlying working, can use temporary workers and hourly-waged employees. By quantifying the duty of every worker, then make performance appraisal link up with wages to improve labor production efficiency and control labor costs.

Also need to enhance employees' training, and constantly improve staff technical quality, realizing high efficiency and quality operation by a handful people. Operating and using high technology can effectively reduce the maintenance frequency and increase the service life of equipment, reducing energy consumption at the same time.

#### **4.3 strengthen the cost management consciousness**

Establishing rewards and punishment mechanism linked with cost control indexes, rewarding department or employee for controlling the cost within budget strictly. On the other hand, may give punishment so that can boost the enthusiasm of the employees to reduce cost.

#### **4.4 reasonable control of equipment and facilities maintenance costs**

Rail transit vehicles, main equipment and infrastructure should be overhauled and maintained regularly. They all have a certain depreciation life so this amount can't be neglected in the operating costs.

At present, maintenance of domestic rail transit vehicle and equipment system usually using self-repair, outsourcing and other type. Choosing the appropriate maintenance contractors is an important factor of the cost control. Therefore, market competition mechanism should be introduced, then expand the scope of the maintenance contractor selection, reducing maintenance cost by competitive bidding. At the same time, also need to increase the intensity of digestion and absorption of the introduced technology and staff training. It is necessary to strive to grasp more routine equipment maintenance, maintenance technology, reducing maintenance outsourcing capital expenditures. Strengthen the equipment testing with reasonable cycle and scientific-planned maintenance, which can greatly reduce loss, increase its service life and service quality. Finally, reduce the demand for maintenance, and make the maintenance costs under control.

Feasibility study is indispensable to equipment renewal and infrastructure modernization. For unnecessary update equipment which is old but running well should keep as far as possible. Avoid by all means blindly updating equipment and facility due to "face project" or mind of rivalry.

#### **References**

- Ou Guoli, Zhang Xiaoxue. The subway operation cost analysis and research. *Journal of Northern Jiaotong University*,1994(9).
- Chen Wenyu. The subway operation cost characteristic. *Modern Urban Transit*, 2006(4)
- Jin Chenhu,Lu Yu. The development strategy of urban rail transit operation management. *China Railway*,2004(8)
- Lu Jindong. Hong Kong metro operation management. *Urban Public Utilities*,1994(4).
- Yan Jinglin. A primary study on the subway operation cost. *Railway Economics Research*,1999(6)