

Optimal Management of Urban Rail Transit Operation

Gao Xihe

Yangling Vocational and Technical College Traffic and Surveying Engineering Branch, Xianyang, Shaanxi
712100, China

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Abstract: With the rapid development of China's society and economy and the acceleration of urbanization, urban rail transit has developed rapidly and achieved productive social and economic benefits. Operation management is the key foundation to ensure the harmonious development of urban rail transit industry. Facing all kinds of new problems and situations brought by the rapid development of urban rail transit, it is of great practical significance to continuously optimize the operation management of urban rail transit. This paper introduces the general situation of urban rail transit, analyzes the main problems in the operation and management of urban rail transit at present, and puts forward suggestions for the optimization and management of urban rail transit operation for reference.

1. Introduction

With the rapid development of China's society and economy and the acceleration of urbanization, urban rail transit has developed rapidly and achieved productive social and economic benefits. By the end of 2019, there are 39 cities in Mainland China that have already operated urban rail transit, with a total operating mileage of about 5800 km, it is expected that the mileage will exceed 6000 km in 2020. Guangzhou Metro Line 3, Beijing Metro Line 10 and Shanghai Metro Line 2 are among the top ten urban rail transits in China. Daily passenger traffic volume of single line handled more than 1 million passengers, or even reached 1.5 million passengers. On the whole, China ranks first in the world in terms of the number of cities operating urban rail transit, total mileage of urban rail transit operation, and total passenger traffic volume of urban rail transit. It ranks the top in the world in terms of key indicators such as the operation reliability, punctuality rate and safety of rail trains. It can be said that in the new era of China's socialist modernization, urban rail transit has become the main artery of each city, playing an irreplaceable role in promoting social and economic development, scientifically planning the urban layout, and improving the structure and current situation of urban traffic, etc.

Operation management is the key foundation to ensure a stable development of urban rail transit industry. Facing all kinds of new problems and situations brought by the rapid development of urban rail transit, it is of great practical significance to continuously optimize the operation management of urban rail transit.

2. General Situation of Urban Rail Transit

In the national standard *Common terms of urban public transport* formulated by China, the definition of urban rail transit is “the general term of rapid and large volume public transport which is usually driven by electric energy and adopts wheel rail transport”. At present, China's urban rail transit mainly consists of subway, light rail and modern tram.

Compared with other types of urban transportation system, urban rail transit has its own significant advantages. First, the transportation capacity is strong. Taking subway as an example, the subway train can form multiple carriages, with short departure interval and fast speed. It can transport about 60,000 passengers per hour on average, and can transport a large number of passengers in a short time, which is incomparable with other means of transportation. Second, the speed and punctuality rate of urban rail transit are high. Urban rail transit runs on the special track,

so it completely avoids the interference of other means of transport in the operation process, and will not be affected by traffic congestion, bad weather and other factors. At the same time, urban rail transit has a strict operation route and time arrangement, with high speed and punctuality rate. This is also the most important reason why citizens tend to choose urban rail transit. Third, it is safe and comfortable. Urban rail transit has a special track, and there will be no level crossing. In addition, the train technology is advanced and the degree of automation is high, so basically there will be no traffic accidents, so the safety can be guaranteed. At the same time, the train carriage space of urban rail transit is large; air conditioning, lighting, ventilation and other equipment are complete, so that passengers can get comfortable riding experience. Fourth, it is environment-friendly. On the one hand, urban rail transit makes full use of the above ground and underground space, basically does not occupy the surface roads, improves the utilization rate of urban space, and makes urban planning and development more reasonable; On the other hand, urban rail transit uses electric power as energy source, so the train will not produce exhaust emissions and the noise is rather low. Compared with fuel buses and other means of transportation, urban rail transit is more environmentally friendly and efficient.

3. The Main Problems in Operation and Management of Urban Rail Transit

(1).The cost of operation and management remains high. At present, with the rapid development of urban rail transit in China, many third and fourth tier cities with better economic conditions have begun to build urban rail transit. But the construction investment of urban rail transit is huge. Taking subway as an example, the cost of subway construction in some cities in China has exceeded 1 billion Yuan/km. Moreover, the operation and management of urban rail transit in China is in the charge of the government. The organization is overstaffed, the management mode is single, and the efficiency is low. The operation cost is also high, so we have to rely on government subsidies for a long time to maintain the operation. For example, according to statistics, in 2017, the average operating cost of urban rail transit in China was 0.95 Yuan per person · km, and the average operating income was 13.2 Yuan per person · km. According to this calculation, the average operating income was only 0.33 Yuan per person · km.

(2).The operation management system is still defective. For many cities that have just completed urban rail transit, they have no experience in operating urban rail transit, and the existing systems in other places are often used, which are not targeted with the local actual situation, resulting in the inadequate performance of the system. In addition, because the system cannot reflect the local specific characteristics, only when there are problems in the operation, can the system be reasonably supplemented and improved, so there is a large lag in the management system.

(3).The operation management standard is not as consistent. On the one hand, at present, China's urban rail transit adopts a multi-level management mode. In practice, there are not only national standards, but also local standards. There are big differences in content, and even conflicts with each other. On the other hand, the management of urban rail transit involves many departments, such as rail companies, electric power departments, fire departments, environmental protection departments, etc. Each department has its own industry standards, and there will be mutual restraint in the specific implementation.

In addition, the lack of high-quality management personnel and the slow renewal of management technology and equipment are the main problems in the operation and management of urban rail transit.

4. Suggestions on the Optimal Management of Urban Rail Transit Operation

In 2019, China's Ministry of transport successively issued four regulations, i.e. *Management Measures for Classified Management and Control of Urban Rail Transit Operation Safety Risks and Hidden Danger Investigation and Treatment*; *Management Measures for Operation and Maintenance of Urban Rail Transit Facilities and Equipment*; *Management Measures for Emergency Drill of Urban Rail Transit Operation*; *Management Measures for Information Report*

and Analysis of Urban Rail Transit Operation Risk Events. This further promotes the standardization of urban rail transit management from the national level, and provides a system basis for optimizing the operation and management of urban rail transit.

(1) Rules and regulations need to be taken seriously, which is the basic guarantee for optimizing urban rail transit management. The system should start from three aspects: First, at the national level, the state should continuously improve the laws and regulations of urban rail transit management through legislation to provide programmatic system guidance for the optimization of urban rail transit management; Second, at the local level, the local regulations with local characteristics should be revised to improve the pertinence and applicability of the management system; Third, at the company level, urban rail transit companies should refine the internal management system to ensure that the system covers all aspects of urban rail transit. In addition, they should pay special attention to the establishment of a supervision mechanism for the implementation of the system, ensure that the responsibility is implemented to the people, and improve the consciousness and initiative of the employees in implementing the system.

(2) We should pay attention to the unity of management standards. With the rapid development of urban rail transit in China, it is urgent to establish unified management standards as soon as possible. In the formulation of unified standards, two issues should be concerned. One is proper adjustability. The specific conditions of each city are different, too rigid unified standards can not really adapt to different situations in different regions, so the management standards should reflect the characteristics of the combination of unity and adjustability, leaving a certain space for each region to make scientific adjustment according to its own reality; Second, the standards should be far sighted. With the rapid development of urban rail transit, especially the wide application of new technology in urban rail transit, the object, scope and requirements of management standards are constantly changing. Therefore, the formulation of standards should be properly foresighted, the development trend of urban rail transit should be predicted scientifically and accurately, and the standards should be revised and improved in time to ensure the continuous play of the role of standards.

(3) The improvement of managers' quality should be paid attention to. To improve the quality of management team is the key to optimize the management of urban rail transit. First of all, it is necessary to improve the professional ability of management personnel, carry out professional skill training in accordance with different management post requirements, and improve the practical ability of the team; second, it is necessary to improve the cooperation ability of management personnel. Urban rail transit management is a systematic and comprehensive work, which cannot be separated from the cooperation of management team. Only when the management team has a high degree of cooperation awareness and ability, can the management efficiency be maximized. In addition, the professional ethics of management personnel should be improved. Urban rail transit is related to the safety of people's travel and has a great responsibility. The management team must have excellent professional ethics, especially to establish a high sense of safety responsibility and resolutely deal with the occurrence of safety accidents.

(4) We should make more use of modern technology. The development of modern science and technology provides strong technical support for the optimization of urban rail transit management. In practice, we should fully recognize the advantages of modern science and technology in management, increase investment, actively use modern monitoring, communication, security protection, network and other technical equipment, and constantly improve the level of information and digital management, so as to improve management efficiency and quality.

5. Conclusion

China's urban rail transit is in a period of high-speed development. Various new problems and new situations continue to emerge. Optimizing management is an important measure to ensure the stable and harmonious development of urban rail transit. We need to pay more attention to it, update ideas and innovate methods in time, so as to get better improvement.

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