

Sustainable Development of Urban Rail Transit Resources Development

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Abstract: *Urban rail transit system is characterized by high efficiency, good quality, safety and convenience. In the current process of socio-economic development, urban rail transit has become an important component of urban transportation. The acceleration of urbanization in China has promoted the improvement of current urban rail transit technology, and provided high-quality services to alleviate current urban traffic congestion. In the development process of urban rail transit, it presents characteristics such as high operating costs and high investment. It is necessary to choose a reasonable market-oriented development model based on the actual situation to improve the overall economic and social benefits of urban rail transit.*

Keywords: urban rail transit: sustainable development: strategies.

1. INTRODUCTION

With the continuous development and construction of China's economy, various cities are vigorously developing transportation, and some large cities are also pushing towards rail transit, which is also to meet people's travel needs. Urban rail transit can be more timely, efficient, and has a large passenger capacity. The operational status of urban rail transit directly affects the operation of the urban economic and social system. The policies of China's urban rail transit industry have been more optimized, and the operating routes and passenger volume of China's urban rail transit have also steadily increased, indicating that there is still a significant market demand for the development of urban rail transit in China.

Under the guidance of sustainable development strategy, both domestic and international efforts are being made to develop rail transit to solve urban transportation problems. On the basis of learning from advanced foreign experiences and based on the specific realities of each city, urban rail transit in China is constantly emerging like mushrooms after rain, and its scale is also getting larger and larger. In terms of unique product cycle characteristics, subway projects can be divided into three stages: construction period, growth period, and maturity period. Firstly, the investment is very large and has no benefits, but it has an economic improvement effect on various industries along the line. Secondly, medium operation and revenue coexist, but due to the high operating costs, people have not fully accepted them, so they will still invest a large amount of funds. Thirdly, there is already a sufficient number of customers and they are relatively stable, which can achieve a large amount of capital income and generate good benefits. There are four main operating characteristics of urban rail transit: limitations in time and space, amplification of rail transit rights and interests, strong cash acquisition ability, and the ability to achieve modularity in commercial operations within rail transit. In terms of operation, due to the limitations of rail transit.

The investment is large, the cost is high, and the investment payback period is long. The government needs to invest a lot of financial resources every year to maintain the operation of rail transit. Hong Kong Metro is the only one in the world that can make profits through operation, and Shanghai Metro can basically maintain a balance of income and expenditure. We need to adopt various financing methods in the construction and operation of rail transit to eliminate the drawbacks of government financial investment in maintaining operations.

2. SUSTAINABLE DEVELOPMENT ADVANTAGES OF URBAN RAIL TRANSIT

The implementation of curriculum-based ideological and political teaching in foreign language major courses plays an important role in the task of establishing morality and cultivating people, and also bears the dual task of serving the national strategy and promoting the individual development of students. This paper focuses on the historical mission of foreign language major education in the new era to answer the question of "what kind of people to cultivate", clarifies the positioning of foreign language major education, analyzes the purpose and significance of the implementation of curriculum-based ideological and political teaching in foreign language major courses, as well as the problems, and proposes effective strategies for the implementation of

curriculum-based ideological and political teaching in foreign language major courses in colleges and universities on the basis of this paper, including to enhance the awareness of curriculum-based ideological and political education and competence of English teachers, to enrich the ideological and political content of English teaching materials, to focus on the organic integration of ideological and political education and English classroom teaching, and to strengthen the construction of a system for evaluating foreign language courses in curriculum-based ideological and political education.



Figure 1: The experimental setup.

2.1 Safety and reliability

From the perspective of urban rail transit network as an important infrastructure network, it should have a strong ability to withstand attacks, not be easily damaged, and avoid causing significant impact on the entire city in case of local damage. Small safety is considered from the perspective of urban rail transit as an urban service facility, which can provide safe and reliable operational services to the public and meet travel needs.

2.2 Low carbon and environmental protection

A sustainable urban rail transit system must be environmentally friendly on the one hand and low energy consumption on the other. Environmental friendliness aims to reduce the adverse impact of rail transit on the external environment from construction to operation. This includes reducing the noise generated by train operation, vibration caused by train impact on the track, and electromagnetic pollution caused by electric equipment in the system. Low energy consumption "is a requirement for energy conservation and emission reduction in a series of aspects of rail transit, from equipment to operation management.

2.3 Comfort

Whether in the subway station or in the carriage, the warm winter, cool summer, spring like atmosphere, soft colors, bright lights, and elegant environment give people a feeling of "home at home". It is common to see some young travelers sitting in the carriage, unable to let go of the distance and fatigue of the journey. This is naturally beyond the reach of the limping and rapid turning ground public transportation.

2.4 On time

It is precisely because of the adoption of independent operation and overpass methods that the maximum avoidance of traffic accidents and traffic jams, it can ensure that the On-time performance rate of driving is more

than 98%. Taking the subway in Beijing and Shanghai has become the preferred mode of transportation for "office workers".

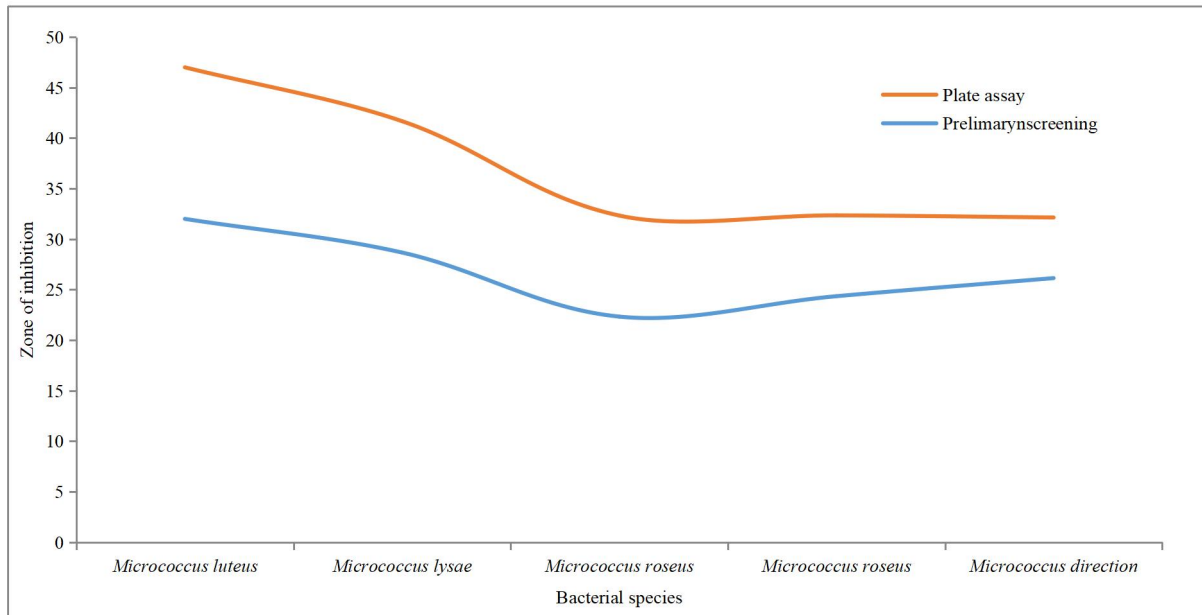


Figure 2: Preliminary screening of bacterial isolates for lipase production and plate assay

Table 1: Lipase activities of the *Micrococcus* spp isolated from “Ugba”

Bacterial Species	Lipase Activity (U/mL)	Optimum Temp(°C)	Optimum Time (days)
<i>Micrococcus luteus</i>	12.20±1.00	37	7
<i>Micrococcus lysae</i>	10.51±2.00	37	7
<i>Micrococcus roseus</i>	14.03±2.10	37	7

3. REQUIREMENTS FOR SUSTAINABLE DEVELOPMENT OF URBAN RAIL TRANSIT

The concept of " Curriculum-based ideological and political education " was first proposed in 2014 when Shanghai universities carried out pilot teaching reforms under the guidance of the Ministry of Education. Curriculum-based ideological and political education in foreign language major courses serves instrumental, human, and international purposes, and the implementation of curriculum-based ideological and political education in foreign language major courses is crucial to the fundamental mission of establishing morality and cultivating people. It has the function of tool-base, aiding students in acquiring foreign language skills and knowledge, and enhancing their capacity for international communication. Foreign language instructors should actively guide students in the formation of correct humanistic concepts, cultivate their human literacy and humane concern through their teaching practices. The function of internationality is reflected in the fact that curriculum-based ideological and political teaching in foreign language major courses should focus on cultivating students' respect and understanding of other countries and cultures, and cultivating the ability of cross-cultural communication.

3.1 Incomplete management system

The true development time of urban rail transit is in the past decade, mainly concentrated in the past five years. It is precisely because of the vastness and complexity of urban rail transit that the development of its management system is difficult. At the same time, some urban rail management departments lack awareness of the importance of management systems and neglect the construction of urban rail management system, This directly leads to the lack or imperfection of some urban rail transit management systems in China. The imperfect management system of urban rail transit will lead to some outstanding problems that cannot be solved. The imperfect management mechanism of urban rail transit is also reflected in the limitations of the system itself. The management departments of various cities have not been able to strengthen their understanding of the management system at a

large level, and have not taken into account the rapid development of rail transit. The imperfect management system seriously affects the further development of urban rail transit.

3.2 Improvement of Technology and Industry

The implementation of "low-carbon environmental protection" and "intelligence" must be based on advanced technology. The energy-saving and emission reduction of urban rail transit involves multiple professional technologies in the fields of operation organization, vehicle equipment, power supply system, ventilation and air conditioning system, new energy, etc. The solution to a series of problems such as noise and vibration depends on continuous monitoring of technical indicators and analysis of test results. Therefore, it is necessary to pay attention to basic research on key technologies and the development of advanced technologies. The intelligence of urban rail transit is a product of the integration of a series of technologies, including both hard technologies such as communication technology, signal technology, new energy technology, and soft technologies such as operation organization management, information services, etc. [2]. Therefore, it is necessary to continuously update hard technology, improve the level of intelligent control, and also pay attention to the improvement of soft technology to improve the level of intelligent management and intelligent services.

3.3 Improvement of Theory and Methods

With the formation of urban rail transit networks and the increase in passenger volume, the impact of an accident occurring at a "point" may present. The spread of "lines" and "surfaces" leads to significant social and economic losses. The importance of safety for urban rail transit in China is becoming increasingly evident. It is necessary to scientifically analyze the vulnerability of urban rail transit system, establish the vulnerability analysis theory and method, provide the basis for defining the key elements of the network and predicting the impact of events, and run the vulnerability analysis through the whole process of network planning and design, operation and management, so as to strengthen the resilience of the rail transit system to disasters and attacks.

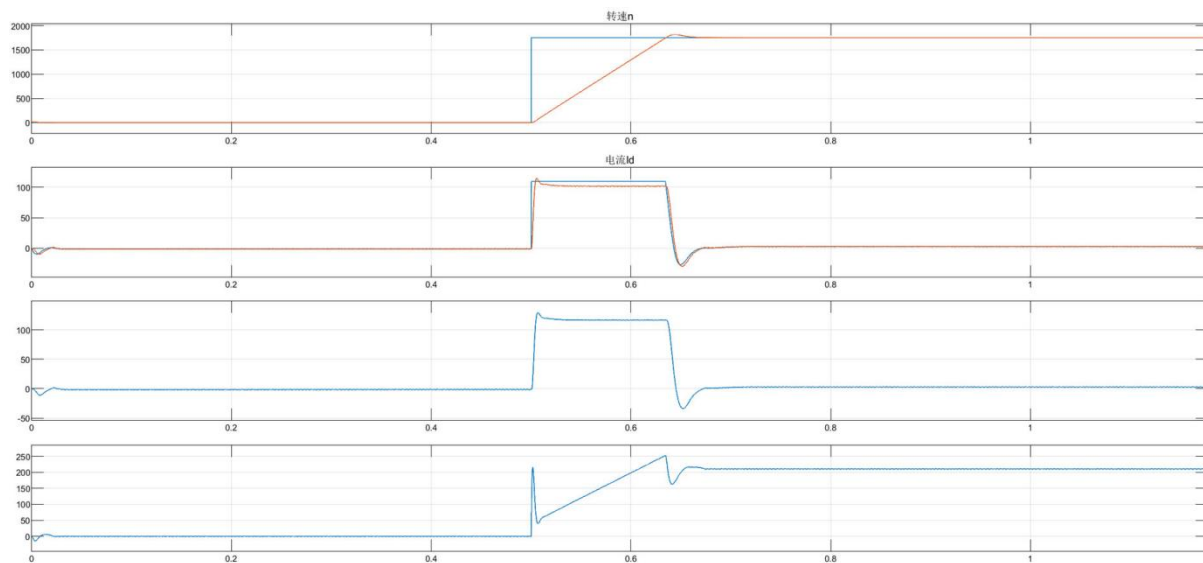


Figure 3: Speed regulator has simulation waveform against Integral windup

4. SUGGESTIONS FOR SUSTAINABLE DEVELOPMENT OF URBAN RAIL TRANSIT IN CHINA

4.1 Improving the relevant institutional system of urban rail transit

The level of industry standardization has a significant impact on the improvement of international competitiveness of the industry. Urban rail transit is developing rapidly, but the formulation of systems and standards is slightly lagging behind. At present, the classification standards for various systems of urban rail transit are not perfect, and the system standards for technology, quality, production capacity, production requirements, construction,

operation, maintenance, environmental protection, and other aspects of different systems are also not detailed. The improvement of the system is one of the standards for testing the level of development of an industry. It is necessary to build an institutional system for the urban rail industry and formulate project approval planning standards. During the project initiation stage, ensure that the project conforms to the coordination of regional development, the affordability of economic benefits, and the balance of the environment; In the construction and operation stages, establish a standardized management system, standardize management, streamline processes, and avoid problems such as management chaos, unreasonable planning, resource waste, and operational safety caused by incomplete systems.

4.2 Safety oriented, promoting operation informatization, intelligence, and intelligence

Adhere to people-oriented principles, with the fundamental goal of providing safe, convenient, efficient, and comfortable high-quality services. Make full use of the Internet, Big data, artificial intelligence technology, etc., innovate urban rail transit operation technology, promote the intelligent development of urban rail transit operation service, and improve the safety capability and service efficiency of urban rail transit operation. Establish and improve a long-term management mechanism for urban rail transit operations, establish a scientific and reasonable enterprise organizational structure, clarify the responsibilities and authorities of each department, and enhance the overall management ability of the organizational structure; Continue to promote the standardization and standardization of relevant standards in the urban rail transit industry, promote the introduction of national laws and regulations related to urban rail transit operation, and operational safety evaluation standards, and achieve that all urban rail transit enterprises carry out operational safety evaluation and performance assessment based on industry standards and legal basis, and improve operational service standards. In the daily operation of urban rail transit system, the line network emergency command center monitors and coordinates the operation of each line in the line network. In case of emergency, the emergency command center can quickly start the emergency processing process, command, dispatch and control the cross line industrial equipment involved in the line network operation, and timely prevent or reduce Losses caused by minor emergencies.

4.3 Combining Land Use

Urban development and land use have the closest relationship and should be mutually promoted and constrained. 'Demand' comes from land use, 'supply' comes from transportation demand. The development direction of urban rail transit is first and foremost characterized by networking. It has been a long time since rail transit entered networking. With the increase of lines and passenger flow, it is necessary to organically connect the lines, and then implement factors such as safety, technology, and resources during construction. Furthermore, it is necessary to implement a network sharing mechanism on the established network system to reduce the cost of construction and operation, and then reasonably control risks. Secondly, in the overall urban planning, in order to further expand the space within the city, the construction of rail transit should exhibit a diversified trend. For long-distance travel, direct and fast transportation services should be implemented, and suburban routes should be focused on planning around the city area to meet the diverse needs.

5. CONCLUSION

In the process of continuously increasing urban population, we want to promote the development of cities. The smooth progress of modernization construction requires the construction of urban rail transit, which can not only alleviate the traffic pressure of the city, but also bring convenience to people's travel and life. Urban rail transit has gradually become popular in many cities in China. It can bring many conveniences to people while also increasing government revenue. Urban rail transit has gradually become a powerful tool for improving the urban transportation structure and alleviating the increasingly serious contradiction in transportation demand, with the characteristics of speed, convenience, comfort, and environmental protection.

REFERENCES

- [1] Urban rail informatization at the intersection of the 13th Five Year Plan and the 14th Five Year Plan [J] Urban Rail Transit, 2020 (10): 30-32
- [2] Dai Ruyu A bilevel programming model and algorithm for urban rail transit ticket prices based on the cumulative prospect theory [D] East China Jiaotong University, 2018

- [3] Peng Kun, Long Qiong The main problems and development strategies of urban rail transit in China [J] Technology Information, 2019, 17 (34): 63-64
- [4] Li Shengming Current Situation and Analysis of Urban Rail Transit Development in China [J] China Equipment Engineering, 2020 (10): 235-237
- [5] Zheng Zhiying, Liu Xin. Construction and Practice of Innovation and Entrepreneurship Education System [J]. Industry and Information Technology Education, 2022 (12): 76-79.
- [6] Zhang Xiaorui, Ma Xiaodi, Ding Guangbin Research on the Construction of the "Five in One" Innovation and Entrepreneurship Ecological Education System [J]. Journal of Hebei Engineering University, 2020 (12): 115-119.
- [7] Liu Jun, A Study on the Constraints and Countermeasures of College Students' Innovation and Entrepreneurship Ability [J]. Intelligence, 2020 (6): 15.
- [8] Anshun Municipal Government Office. Anshun Natural Geography [EB/OL]. http://www.anshun.gov.cn/zjas_1/asgk_5866721/zrdl_5866728/202107/t20210723_69216824.html, 2023-05-12.
- [9] Anshun Statistics Bureau. Anshun 2021 Statistical Yearbook [EB/OL]. http://www.anshun.gov.cn/zfsj/tjnj/202212/t20221219_77621728.html, 2022-12-19.
- [10] Zhou Dong, Long Yi, Tang Guo'an, et al. Research on Hybrid Index Method for Aggregation and Distribution Spatial Data [J]. Geography and Geo-Information Science, 2010, 26(01): 7-10.
- [11] Cheng Qian, Ling Supei. Analysis of Spatial Distribution Characteristics and Influencing Factors of China's Intangible Cultural Heritage [J]. Scientific Geography, 2013, 33(10): 1166-1172.
- [12] Zhao Menglong. Evolution and Mechanism of Spatial Pattern of Rural Settlements: A Case Study of Anshun City, Guizhou Province [J]. Urban Architecture, 2021, 18(28): 60-67.