

Research on the Improvement of Logistics Turnover Efficiency by Carrying High-speed Trains on the Same Journey

-- Based on the Current Situation and Development Prospect of General Railway Luggage Transportation

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Abstract

Luggage trolleys are a type of vehicle type hung at the front or rear of normal-speed passenger trains (types 25B, 25G, and 25T, etc.), marked with "XL", and used to provide luggage and parcel transportation services at stations along the line. In the past ten or twenty years when logistics transportation was underdeveloped, it was widely favored by people because of its faster speed than passenger trains and the advantages of passing through many small and medium-sized cities along the line. It was the only choice for realizing the circulation of small quantities of goods at that time. This method of railway luggage transportation is called "carriage delivery" among ordinary people. Since the 12th Five-Year Plan, China's high-speed rail construction achievements have attracted worldwide attention. The operating mileage of high-speed railways is close to 40,000 kilometers, ranking first in the world. All provinces have successively realized "city-to-city high-speed rail", which greatly facilitates people's travel. Under the overwhelming advantage of speed, high-speed trains have gradually replaced normal-speed trains and become the first choice for passenger rail travel. Different from normal-speed trains, high-speed trains basically do not take both passengers and cargo into consideration in model design and transportation organization. In other words, high-speed trains are not equipped with luggage carts to carry out luggage transportation business. Despite the rapid development of the logistics industry, logistics companies of different sizes continue to promote the improvement of transportation speed and service quality, but under the basic mode of logistics management today, most of the packages need to be transferred and distributed between major stations. How to improve the utilization efficiency of existing railway transportation resources, and how to divide the normal-speed luggage car luggage transportation mode into parts through Pareto improvement and continue it to high-speed rail transportation. This paper discusses how to carry out high-speed rail high-speed trains on the same journey with China Railway Express as the main body of the organization. Reference may provide some ideas for reference.

Keywords

Luggage Carts; Railway Luggage Transportation; Same-distance Carrying; China Railway Express; Pareto Improvement.

1. Research Background

1.1. Development History of Luggage Carts

Luggage carts have a long history, and their origins can be traced back to the 1970s and 1980s. Since the Third Plenary Session of the Eleventh Central Committee, my country has implemented the great policy of reform and opening up, and the economy has developed rapidly. The traffic flow has increased year by year with the flow of people and the circulation

of goods, constantly refreshing the historical peak. In order to further improve the efficiency of railway transportation and improve the riding environment, the former Ministry of Railways (now the China National Railway Administration Group Co., Ltd.) issued the latest version of the "Railway Transportation Dispatch Rules" in 1983, pointing out that the balance of the number of trains in each railway sub-bureau, the prohibition of carriages of passengers, and the strengthening of the management of freight trains and guard cars are important measures to regulate my country's railway passenger and freight transportation. Under this background, the baggage carts came into being, and with the speed increase of normal speed trains, 25B, 25G, 25K and 25T luggage carts were successively developed, and one section was installed at the front or tail of the corresponding passenger trains.

The transportation organization method of luggage carts is that there is a porter's office on the cart, and luggage compartments are set up at each stop station along the line for handling passenger transport business. When passengers boarding at the station carry more luggage than the limit or carry dangerous and prohibited items, they can check in the luggage room. At the same time, the luggage room provides luggage transportation services for non-travel passengers. Non-travel passengers can choose the final station and the train for delivery. It is also here to pick up mail sent by others from other places through luggage carts. When a passenger train stops, the staff in the private room will connect with the porter on the luggage cart, and complete the loading and unloading of outgoing and arriving goods within the stop time. This method is called "sending cars" among the common people, and it has the same status as car trips. It was the only choice for people to realize the transportation of small and medium-sized goods in addition to the postal service in the past.

The advantage of the luggage cart is that its transportation organization mode of passenger and cargo transportation makes the cargo transportation have the same speed as passenger transportation. Whether it is in railway or road or waterway transportation, the speed and grade of passenger transportation are usually higher than that of freight transportation, which means that passengers traveling the same distance by car will save a lot of time than postal mail. Luggage carts give full play to the superior speed of passenger trains, allowing cargo and mail to take the "free ride" of the bellman, and realize the one-stop direct delivery of goods along the train stop. Therefore, it has been widely used for forty or fifty years since its inception.

1.2. Existing Status of Luggage Cart Baggage Transportation

With the development of my country's information technology and driven by the digital economy, online shopping has entered thousands of households, and courier stations have bloomed everywhere, providing more convenient and efficient channels for people to send mail. Luggage carts have gradually faded out of people's vision, and demand continues to decrease. On the other hand, my country's high-speed rail construction has made remarkable achievements, forming an "eight vertical and eight horizontal" road network layout, and high-speed trains have become the first choice for passengers to travel by rail. According to statistics from the EPS data platform, the number of normal-speed passenger trains in my country has dropped from 2,376 in 2013 to 1,352 in 2022, a reduction of nearly half. Correspondingly, the number of trains and stations that provide luggage cart luggage transportation services is decreasing, and the supply is limited.

1.3. The Same Journey Portability of the Acquaintance Economy

Although the supply and demand of the railway normal-speed baggage car luggage transportation business has decreased simultaneously, accounting for a small share of the logistics market, and falling into the dilemma of a negative feedback loop, this does not mean that the same-haul logistics method carried by luggage cars has been diluted from people's lives. Compared with the transportation services provided by many logistics companies, the one-stop direct transportation on the same journey still has obvious advantages in speed and time, which

is especially prominent among small and medium-sized cities. Therefore, it is not uncommon in daily life to entrust acquaintances with the same purpose to help pick up items. However, the seemingly easy work of a free ride requires the information between the two parties to be completely unimpeded, to be able to know each other's supply and demand, and to achieve an effective match between supply and demand. This limits the same journey to acquaintances. When a sender has limited interpersonal communication, he has to choose an ordinary logistics company, and there is room for Pareto improvement in the same journey.

2. The Principle of Carrying on the Same Journey

2.1. The Idea of High-speed Trains on the Same Journey

According to the current "Railway Passenger Transportation Regulations", each adult passenger can carry items not exceeding 20 kilograms for free. However, the actual situation is that most passengers do not carry their personal belongings weighing about 20 kilograms every time they travel. Therefore, it is not uncommon to entrust acquaintances to carry items to the same destination in real life, especially some urgent and light non-prohibited items.

Based on this, it is not only the fast speed of the high-speed trains and the "eight vertical and eight horizontal" road network pattern extending in all directions, but also the weight of most passengers' carrying items has not reached the upper limit, and there is still room. Taking China Railway Express as the main body to carry out high-speed trains on the same journey can make full use of the remaining resources, meet the demand gap, and carry the small and medium-sized goods that urgently need to be circulated between some large, medium and small cities through the same journey of passengers, so as to realize the rapid circulation of goods and promote the further improvement of logistics turnover efficiency while improving resource utilization.

The same journey carrying business process with China Railway Express as the main organization is that China Railway Express and the National Railway Corporation will renovate existing private rooms or build new logistics turnover points at high-speed railway stations in various cities, and collect the packages of senders who are willing to use the same journey carrying logistics mode in the city. Put the weight and destination information of the package into the 12306 railway passenger transport service platform, and the platform database will automatically push the information to the passengers who have purchased the tickets to the same destination. Passengers arrive at the pre-station logistics turnover point to pick it up before entering the station and boarding the train, and deliver the package they carry to the destination station's pre-station logistics turnover point after arriving at the terminal station and exiting the station, and get corresponding rewards. The mail that arrives at the logistics turnover point of the destination city can be picked up by the recipient himself, or delivered by the courier of China Railway Corporation.

The same-distance carrying business with China Railway Express as the main body is to continue the baggage transport of ordinary railway luggage carts into parts and continue on high-speed trains. It is to entrust others to send mail and use the market mechanism to get rid of the constraints of the economic scope of acquaintances, and realize Pareto improvement (making at least one person's situation better without changing anyone's situation). Carrying the same journey not only enables passengers who take high-speed trains to get remuneration to offset travel expenses when they have spare time, but also allows senders to enjoy one-stop high-speed rail direct mail service on the public information platform. my country Railway Corporation, as an information intermediary and business development entity, can also benefit from it.

2.2. Organizational Subjects and Actors

The continuous development of the luggage transport of ordinary-speed railway luggage carts on high-speed trains through the same way of carrying, with China Railway Express as the main business organization and passengers as business actors, is mainly based on the principle of seeking truth from facts and cost-effectiveness.

First of all, high-speed rail trains do not copy the luggage business of normal-speed luggage carts, which is a practical requirement of transportation organization scheduling and vehicle model design. On the one hand, the design standards of high-speed railway lines are high and the traffic density is high. Except for reversing, the stop time of high-speed trains at stations along the way is significantly shorter than that of ordinary speed trains. It is almost difficult for porters and station staff to complete the arrival and delivery of bags within the stop time. On the other hand, the carriages of the high-speed trains adopt external sliding doors, which are characterized by high airtightness, stability and intelligence, and are in line with their high speed. On the other hand, the two-way hinged door of the traditional ordinary railway baggage car has a large opening range, which is a design suitable for the caliber of the forklift on the platform, but its airtightness is poor. If this design is used in a high-speed train, it will cause the airflow to flow back into the car body during driving, which greatly affects the safety and comfort of driving. Therefore, with the passenger as the business actor, the package carried on the same trip accompanies the passenger to get on and off the bus without taking up extra time, which effectively overcomes the above-mentioned contradictions between the arrival and departure time of the luggage trolley and the stop time and the vehicle design.

Secondly, the high-speed rail trains carry out the same journey business with China Railway Express as the main body of the business organization, out of the need for information transmission and package transportation safety. The key link of the same journey is "same journey", that is, the information matching of the same destination. The most complete and timely information about railway passenger travel is the 12306 railway platform. China Railway Express and 12306 platform both belong to the National Railway Group Co., Ltd. and are in charge of passenger and freight transportation. In addition, the actors carried on the same journey are passengers by car, and the security of the package and the identity and credit of the passenger are important factors that need to be taken into consideration. With China Railway Express as the main body of the business organization, the identity and credit of passengers can be effectively authenticated through the railway information system, and the safety performance of packaged mail is guaranteed through the monitoring of railway train stations and the joint actions of police officers. The above two factors are the important aspects that the realization possibility of the same journey with China Railway Express as the main body is higher than that of ordinary private enterprises.

3. Innovative Features

3.1. Pareto Improvement

The development of high-speed trains on the same journey is the common benefit of China Railway Express, passengers and delivery demanders, and can achieve Pareto improvements in China Railway Express' business, passenger carrying capacity, and supply audiences.

The main business of China Railway Express is general railway freight trains, express freight trains (Xinshi Express Delivery Company) and high-speed rail express delivery. Common railway freight trains generally use wagons (that is, one carriage) as a unit, and are suitable for contracted transportation of bulk cargo, while express freight trains and high-speed rail express mainly serve major cities and railway hubs. Carrying out the same-distance carrying business of high-speed rail trains, China Railway Express, as the organizer of the business and

the transmitter of information, can use the existing conditions and resources to further expand the scope of business and expand profit margins.

For passengers, if they still have enough energy to get on and off the bus, they can get a reward by carrying two or three more packages when they get on and off the bus, and reduce a part of the transportation cost, which is also a Pareto improvement. Similarly, the high-speed rail EMU same journey provides a supply platform for passengers who want to send mail in this way, and uses the market mechanism to get rid of the constraints of the acquaintance economy. The above three aspects are not only the specific manifestations of Pareto improvement among different subjects, but also the innovative features of this project.

3.2. National Logistics Model

With the development of social economy, the sharing economy model has gradually entered into daily life and has been favored by people. The sharing economy is a new business model that uses the Internet platform to optimize the allocation of scattered resources, and promotes innovations in asset ownership, organizational forms, employment models, and consumption patterns to improve resource utilization efficiency and facilitate people's lives. The same journey of high-speed trains is a concrete manifestation of the sharing economy in terms of logistics travel. It uses the database to match packages and passengers with the same destination, and uses the idle resources that can provide labor services when passengers are traveling by car to create value by carrying other people's packages. Any passenger who has passed identity and credit authentication can become a business actor. Tongcheng brings a large number of qualified passengers into the value creation of logistics and transportation services. It is a national logistics model under the sharing economy and a major innovation point of this project

4. Application Prospects

4.1. Advantages of the Method

As a continuation of ordinary railway baggage car luggage transportation, the above-mentioned high-speed rail carriage on the same journey can improve the efficiency of logistics turnover. It has a solid practical foundation and consumer recognition, and is quite scalable. It is a beneficial supplement to the current mainstream logistics model and can better meet the needs of urgent shipments, especially between small and medium-sized cities. The operation of high-speed trains can be regarded as a public good in the economic sense, which has high fixed costs, but the marginal cost of carrying one more passenger or carrying one more luggage is infinitely close to zero. Therefore, carrying out the same-distance carrying business can further improve the utilization efficiency of transportation resources and realize Pareto improvement on the premise of utilizing existing resources and economic consumption, which is an organic unity of social benefits, environmental benefits and economic benefits.

4.2. Error and Sensitivity Analysis

This paper discusses that China Railway Express Company is the main organization to carry out high-speed train transportation on the same journey, focusing on the parcel transportation between small and medium-sized cities. In addition, there is an upper limit on the weight of packages that can be carried on the same journey, and the maximum value is the maximum weight allowed in the railway transportation regulations minus the part of the passenger's own luggage. Therefore, compared with the mainstream logistics mode, it does not conform to the principle of cost-effectiveness and does not have significant advantages for the same-distance transportation mode for large-scale or heavy-volume parcel transportation. However, even so, there is still a lot of market room for the same-distance portability model in small and medium-sized cities. Localities can predict supply and demand on the basis of preliminary market

research, make reasonable decisions, carry out scientific management, and insist on proceeding from reality and seeking truth from facts to achieve the unity of theory and reality.

Acknowledgments

Funded by the Innovation and Entrepreneurship Training Program for College Students of Anhui University of Finance and Economics (S202210378194).

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