

## Research on China Highway-Railway Transport Construction and Operation Mode of the Comprehensive Passenger Transport Hub

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**Abstract.** “Twelfth Five Year Plan” period is the key period for China to promote the construction of comprehensive transportation system. As an important starting point and breakthrough point to promote the construction of comprehensive transport system, comprehensive passenger transport hub has been developed greatly with the energetic efforts of the government, of which more than 90% of the comprehensive passenger transport hub are highway-railway transport comprehensive passenger transport hub. Because of influences caused by many factors such as early system, there is little experience in the planning, construction, financing, operation and other aspects of comprehensive passenger transport hub, the highway-railway connection. This paper plans to analyze the typical established highway-railway transport comprehensive passenger transportation hub in China from the planning, construction, financing, operation and other issues, in order to provide reference for subsequent highway-railway transport comprehensive passenger transport hub construction.

**The current development situation of China highway-railway transport comprehensive passenger transport hub**

During “Twelfth Five Year Plan” period, along with the centralized construction of highway, railway, civil aviation and other transport infrastructure in our country, comprehensive transportation system enters into the key stage of network construction; comprehensive passenger transport hub also faces the best development opportunities synchronously. As an important part of

comprehensive transportation system, the comprehensive passenger transport hub is the key to realize the effective cohesion and integrated transfer between various external transport means and city traffic. In “Transportation ‘Twelfth Five Year’ Development Plan”, Ministry of transport points out clearly that during “Twelfth Five Year Plan” period, 100 comprehensive passenger transport hub connected with railroad will be constructed, in which 40 sets of highway, railway, rail transit, city bus, taxi and many kinds of ways in one modern large scale comprehensive passenger hub will be constructed in 36 central cities. Because the construction of this kind of comprehensive passenger transport hub is still in the initial stage, the railway facilities have already completed construction or completed design in some of comprehensive passenger transport hub, need the active connection of highway passenger station in the design and the construction, these current status propose new and higher requirements for the construction and operation of the comprehensive passenger transport hub.

According to statistics, at present highway-railway comprehensive passenger transport hub accounts for 90% of comprehensive passenger transport hub in our country, among which many typical hubs also includes rail transit, conventional bus, taxi and other transport modes.

**Table1. The basic situation of highway-railway comprehensive passenger transport hub in our country**

Station Name	Transport mode						
	Railway	Aviation	Long-distance Highway	Rail Transit	Conventional Bus	Taxi	Public Vehicles
Beijing South Railway Station	✓			✓	✓	✓	✓
Shanghai South Railway Station	✓		✓	✓	✓	✓	✓
Shanghai Railway Station	✓		✓	✓	✓	✓	✓
Shanghai Hongqiao International Airport	✓	✓	✓	✓	✓	✓	✓
Nanjing South Railway Station	✓		✓	✓	✓	✓	✓
Nanjing Railway Station North Square	✓		✓	✓	✓	✓	✓
Wuxi Railway Station	✓		✓	✓	✓	✓	✓
Guangzhou South Railway Station	✓		✓	✓	✓	✓	✓
Wuhan Yangchunhu Passenger Transportation Center	✓		✓	✓	✓	✓	✓
Chengdu Shahepu Station	✓		✓	✓	✓	✓	✓

Due to the fact that highway-railway comprehensive passenger transport hub in our country is still at the starting stage, for a long time, affected by the management system, highway and

railway constructs transport hub respectively, without overall planning, with poor interconnection, various investment subjects, operation management confusion. Not only brings inconvenience for the passengers, increases comprehensive transportation cost, but also reduces the overall transportation efficiency.

## **Analysis on Planning, Construction, Financing and Operation Mode of Typical Highway-Railway Comprehensive Passenger Transport Hub in China**

### **Nanjing South Railway Station Comprehensive Passenger Transport Hub**

#### **Analysis of planning and layout mode**

Nanjing South Railway Station comprehensive transport hub is approximately 600m in the range, fusing of the railway, long-distance passenger transport, bus, rail transit, taxi and the public parking, connect 5 major traffic system together fully through more than 200 elevators, realize the true meaning of “zero transfer”. The first of the Nanjing South Railway Station railway station implements rail station and car passenger station layout in the same three-dimensional space for the first time, is the largest three-dimensional zero transfer modernization integrated passenger transport hub in Nanjing, covers an area of about 6 million square meters, function as Nanjing city traffic portal.

Nanjing South Railway Station project constructs according to the national level of long-distance bus station standard, covers an area of about 70 thousand square meters, construction area of about 22 thousand square meters. Peak hour sends and reach quantity are 4,800 and 1,440 passengers per day respectively, the highest passenger gathering number is 3,200, 1,917 departure buses per day, 40 parking stalls, and 20 passenger stations. Car passenger station is divided into two parts of reception departure yard and servicing field, passenger reception departure yard provides tickets booking, waiting, long-distance truck reception and departure, passenger in and out, vehicles servicing field provides long-distance bus parking, cleaning, located out the hub, a distance of about 1 kilometers, covers an area of about 35 thousand square meters.

#### **Analysis of construction financing mode**

Nanjing automobile passenger station has a total investment of about 42 million Yuan, with conventional construction mode; funded jointly by the Ministry, province and city three-level governments, railway investment companies are entrusted to participate in the train station unified organization design, construction.

The government provides policy support for extra-project commercial land development to balance the lack of funds for construction. Some of the money source is that government provides the station sites and policy commercial development land freely at the same time. The land is located

outside the Nanjing South Railway Station and the commercial development proceeds are entirely for car passenger station construction. But because commercial land development and operation cycle is long, recovery of funds is slow; the policy has a problem of project financing lag.

#### Analysis of the operation and management mode

Nanjing South Railway Station takes “government-led, state-controlled, public welfare” as the guiding ideology of construction and operation; realizes “separation of construction and management”, “detachment of station and carry”; provides guarantee for the later healthy functioning of the station company. After the completion of the station construction, the station company is established by the government to be responsible for the operation, realizing “separation of construction and management”, getting rid of the heavy burden of construction cost. Department of Transportation takes a stake in the station company by 56% funding (physical capital), the remaining 44% are funded by 4 state-owned holding passenger business companies, integrates Nanjing existing highway passenger capacity, realizes “detachment of station and carry” management mode, which is also the leading thought of Ministry of Transport to the passenger transport station operating mode. At the same time, the government has promised: not participating in profit within 5 years, 5 years later if the station company achieves profitability, then participating in profit, if losses, then subsidies with preferential policies.

#### Guangzhou South Railway Station Comprehensive Passenger Transport Hub

##### Analysis of planning and layout mode

Guangzhou South Railway Station is known as Asia's largest passenger hub upon completion in 2010. Passengers can transfer directly among railway, long-distance passenger transport, subway, bus, taxi and other transportation means within the station. Guangzhou South Railway Station main structure consists of four layers, including three layers on the ground floor and the basement: the first layer on the ground floor is for High-speed Rail in and out, connecting two squares through high design channel. The second layer is for the platform. Guangzhou South car passenger station is located in the north and south sides of the Guangzhou South Railway Station East Square axis, connecting the metro line two and Guangzhou South Railway station, the geographical position is superior and the traffic is smooth and convenient.

Guangzhou South Bus Station is with a total planning area of 31,838 square meters, a total construction area of 46,039 square meters, designed to send 86 thousand passengers per day, is the largest highway main hub passenger transport station in Guangzhou in the area and the sending passenger capacity. There are waiting room, ticket hall, business center, parking spaces, the station, baggage and parcel express, it is the modernized comprehensive long-distance bus station with a set of passenger, station, convenient service and other functions. The first basement layer has

the ticket hall, waiting hall, departure location, including 13 ticket windows, 24 open positions, of which 21 parking spaces, 2 fall positions, and 1 parcel position. The second basement layer has the ticket hall with 13 ticket windows; waiting hall, equipment room, office room, designed to send 43 thousand passengers per day.

#### Analysis of construction financing mode

Guangzhou South Bus Station is with a total investment of about 1.08 billion, divided into three phases, the first phase has been completed and put into operation, designed to send 43 thousand passengers per day. In order to achieve convenient management of projects construction and operation, the Guangzhou South Bus Station Limited Liability Company (state-owned) is established. The first phase is with a total investment 0.46 million, of which the Ministry of Transport subsidizes 50 million, accounting for 10.8% of the total investment; enterprise self-finances 75.16 million, accounting for 16.2% of the total investment; bank loans is 338.21 million, accounting for investment 73% of the total investment.

#### Analysis of the operation and management mode

Guangzhou South Bus Station Limited Liability Company is mainly responsible for the operation of Guangzhou South Railway Station. At the initial stage of construction, the profit mainly relies on passenger revenue; later through gradually develop such as rental shops and other aspects, expanding passenger station revenue content.

#### Shenzhen North Railway Station Comprehensive Passenger Transport Hub

##### Analysis of planning and layout mode

Shenzhen North Station is the only principal station in Shenzhen city, covering an area of 2.4 million square meters, was the extra large comprehensive transport hub with the largest covering area, the largest construction area and the most complete connection function. There are railway, long-distance bus station, bus station, taxi station and public vehicles parking lot in one set, and with the port function. The train station is divided into four layers, including ground platform layer, elevated interlayer, elevated waiting layer and business reservation layer. At present, with the railway passenger flow of 40 thousand people per day, subway passenger 150 thousand per day, with the largest transfer passenger flow, there are more than 20 buses to the city within a whole day.

Shenzhen North Car Passenger Station locates in Shenzhen North Station West Square, put into operation on May 28, 2012, only a very short distance away from high-speed rail west exit, less than 100 meters on foot, transfer is very convenient. The station has 33 parking spaces; sending passenger capacity can be above 20 thousand people per day.

### Analysis of construction financing mode

Shenzhen North Railway Station takes the mode of unified planning, separate design, separate construction, and simultaneous start, is the first passenger hub to connect the subway to the high-speed rail station directly in China. It is the first hub using the BT construction mode, with the total project construction contract. In the process of operation, all operations teams of railway, subway, the subway, and long-distance passenger transport follow the “who development, who management” pattern.

### Analysis of the operation and management mode

Shenzhen North Car Passenger Station is under operation and management by Shenzhen city highway passenger and freight transport service center, in the specific operating process, national railway, subway, the MTR, long-distance passenger transport operate and bear duties respectively, as an entity facing all passengers in face of problems, make responsibility subject clear in accordance with the division of responsibilities inside.

## **Reference and Enlightenment for China Highway-Railway Transport Construction and Operation Mode of the Comprehensive Passenger Transport Hub**

### **Unified planning and layout**

Starting from the overall project development perspective, scientific research the overall layout and the use of space, taking the infrastructure layout, transfer, streamline organization, land interface, transportation network structure and so on into full account, on this basis, the construction subjects continue to deepen the sub project design scheme to ensure the full realization of hub overall function goals, system planning and design railway transportation, highway passenger transport, rail transit, conventional public bus, each sub project must deepen the effective connection of carrying out scheme design, communicate and connect many other details involved the plane and vertical design, architectural avoidance, the entrance and exit setting, the scale of transfer channel, to ensure the full implementation of the overall plan.

### **unified construction financing and operation management**

In terms of financing, it is proposed to popularize the “government- led, integrated construction and management” construction mode, which can make the passenger hub management units get rid of heavy burden construction cost. In the aspect of operation, it is proposed to popularize the “detachment of station and carry” mode and “support station by station” mode. Give full play to the transport enterprise capacity, provide fair operation opportunities for all passenger transport enterprise, improve efficiency in the use of vehicles, reduce vehicle idle, and reduce social cost.

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