Chapter 18
Development Tendency and Solution Research to China's Large Airport Transportation

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Abstract There is small, scattered, weakness and other issues in China's large-scale airport development process. Refer to this, based on analysis of China's current airport traffic status and functional position, research of the current collection and distribution profile of the international large hub airport's ground transportation, ground traffic organization mode. Learned from its advanced experience, this paper proposes a development model suitable for China's large-scale airport, which is a future direction of China's large-scale airport's development that should be combining railway transportation, ground public transportation, airport transportation and urban outbound traffic together as one comprehensive transport hub.

Keywords Large-scale airport • Transportation development • Comprehensive transport hub

Until end of year 2011, the number of domestic large-scale airports whose passenger throughput over 10,000,000/year has reached 27, as the passenger traffic volume continually increased, it stimulates the development demand of airport transportation, but on the other hand, it also exposes some problems which need to be solved as quickly as possible in airport business, like transfer way limited, inconvenient Interchange etc. So based on this situation, this paper conducts some research and analysis on china's airport transportation status and learn from advanced experience of international large-scale airport management mode, dedicates to put forward an transport development model and solution suitable for china's airport situation and hopes to offer an decisional support to china's airport transportation development [1].

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H. Xia and Y. Zhang (eds.), *The 2nd International Symposium on Rail Transit Comprehensive Development (ISRTCD) Proceedings*,
DOI 10.1007/978-3-642-37589-7_18,

18.1 China's Large-Scale Airport Transportation Status Analysis

18.1.1 Airport Function Position Analysis

The function of approaching airport traffic is comprehensive; it always takes many functions at same time like transit, urban citizen's public transportation, and urban external links, therefore it is hard to guarantee the reliability of airport ground transport distribution. And since the rise of construction boom at the airport economic zone around the airport, the non-air transport demands grows, so how to build an functionally-clear and well-facilitated transportation infrastructure within the limited space around airport becomes a big problem for each party in airport construction. there is another main problem that image are more important than function in terminal plan and construction, this leads to air and ground transport unwell-connected, the conflict between passenger flow continually increasing in peak hours and shortage of ground transportation capability shows up gradually [2].

18.1.2 Position of Airport in Transportation Network Analysis

Currently China's airport does not notice its position in generalized mass transportation network, or just simply works as an end link. Normally it only has input or output traffic flow, but no cross traffic flow. Airport's ground transport system usually only includes parking building, bus stations and station platform of railway as last stop, lines are always single-way, but no intersection. So come to conclusion, most of airports could not position itself correctly in transportation network in current big integrated transportation development time.

18.2 International Large-Scale Airport Management Analysis

We can see from decades of Europe & USA airport development course that hub airport will eventually become the hub integrated multiple-transport ways in its located region. As a regional transportation hub, hub airport should consider to build up a multi-dimensional, multi-transport ways of transportation network system, the critical point is building up a correct rail transit to connect airport with city town and how to make rail transit play its role properly.

18.2.1 Example Heathrow International Airport Overview

London Heathrow International Airport is located in 25 km far southwest of London, it is top largest airport of Europe, and its passenger throughput was 69,433,565 in year 2011, 3rd worldwide, four Terminals are under using now. There are two rail transit lines connecting with Heathrow Airport, line London Metro Piccadilly and Heathrow Express (Hex). Both of the two lines have two stops in the airport, which can directly go to terminal 1, 2, 3 and terminal 4 [3].

Heathrow Airport is not only the most important aviation hub, but also the biggest long distance bus station in southeast UK area, now 10 % of long distance buses of whole UK go through Heathrow Airport bus station, you can go directly to 1,200 destination cities of whole UK via Heathrow Airport bus station, another 1,200 cities only via 1 stop exchange.

18.2.2 Inspiration to China's Large-Scale Airport Construction

Beijing Capital International Airport, Shanghai Pudong International Airport and Guangzhou Baiyun International Airport are all aimed at working as Asia most important airport pool, compared with oversea famous airport, China's airport ground transportation mainly rely on road transportation, rail transit as supplement, and has not established its own traffic hub system. So we can get some hint from the inspiration of international airport as follow:

1. Increase the competition ability of public transport in comprehensive transportation network. As to increase the competition capability of public transportation in comprehensive transport network, what we need is to put the public transportation at the first priority in the airport overall construction planning process.
2. Solve the conflict between system and management level in airport construction. There should establish a management system which takes government as a leading role, airport authority as main body in every airport construction phase.
3. Comprehensive concept implement in transportation network construction [4]. In airport construction plan phase. Airport ground transportation design should be put in city comprehensive transportation network scale, not work as isolated terminal, and it should consider the connection between different traffic ways and its extensibility as a transportation hub.

18.3 China's Airport Future Development Tendency Research

18.3.1 Airport's Future Development

The future airport will not only be one link of air transport, but also a connection place of various transport-ways, which is comprehensive transportation hub. The comprehensive transportation hub defines integrating various transportation nodes in comprehensive transportation system. The key point is the interchange between different traffic ways, and using this node to reach multi-mode transportation of various transit ways, to reach optimal effect, break the block among different traffic way, finalized the efficiency of comprehensive transport.

The future airport should be surrounded by traffic ways as much as possible, in order to reach multi-mode transportation, like long distance bus station, Train Station, Highway Station, Metro, road transport and water transport etc. already existed and future traffic ways, we can boldly guess that future airport terminal will be an architecture complex which vertically includes various traffic ways, and executive seamless interchange between each traffic ways, so as to reach out optimal travel way for passenger.

The traffic in hub airport is continuously increasing, and airport scale also increasing, so the future of hub airport should not only be a place for passenger transport and cargo transit, but also a comprehensive city function area, a transportation hub which collects the function of passenger flow, cargo flow, and capital flow together, the future large-scale airport would face a huge challenge, which is transferring its function from single isolated hub airport to multiple-functional and comprehensive transportation hub.

18.3.2 Comprehensive Transportation Hub

The future airport comprehensive transportation hub would have three main function areas: airport terminal; Railway hub and city traffic center, mainly responsible for travel and interchange of air passengers, train passengers and other ground transport passengers.

Airport Terminal: it serves those who travel via aircraft, so optimizing the passenger service process should be put more effort, like rebuild the workflow of inter-transit, shorter the inter-transit time, more satisfaction from client, thereafter increase the proportion of passengers who make inter-transit in airport.

Railway Hub: using location advantage, build advanced railway transportation network, inter-cities express, train, and city metro together as an integrated railway hub.

City Traffic Center: as to collect and distribute the passenger from airport and railway station, it should plan a city public traffic center between them. And this center should include city metro, taxi, long distance bus station and other various traffic ways together to build a comfort, convenient, modern and large city transportation hub [4].

18.4 China's Airport Transportation Development Solution & Suggestion

Through the above analysis, we could see that future of china's airport should be an integrated comprehensive transportation hub using airport as center. From the specific transportation structure side, it should be using railway network as backbones, taking airport transport support, collecting bus stations, taxi station, parking and long distance bus station together or even put them in the same building, to compose an interchange hub with both internal and external functions. The hub can make transfer between express and regular speed traffic way, between external and internal, between walking, parking and vehicle flow, at the same time, it can also contain some shopping malls, service centers or entertainment facilities and other public facilities through extending hub's functional exploitation. This already increase the exploit level of development, so it can not only match people's demand for interchange in peak traffic time, but also give part of passengers a chance to finish daily work or fulfill shopping demands in the middle of interchange. In some degree, it does not only reduce passenger's pure waiting time or pure shopping demand out, but also promotes diversification of public service, therefore it can increase the attractiveness of public transport and passenger traffic volume [5].

18.5 Conclusions

There are still some issues in the development process of china's airport construction, like mis-position, disordered traffic connection and so on. Based on the analysis of china's airport transport organization status, and learning advanced experience of function position and traffic connection in comprehensive transportation system from international hub airport, this paper put forward the future development direction of China's airport, which should be a comprehensive transportation hub model centered by airport itself, meanwhile this paper also offers the solution and suggestion on development and construction of transport hub. It can work as brain reference for China's large-scale airport development.

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