

Research Article

Four in One Three-dimensional Food Transportation Network System

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Abstract: This study takes the overview of the three-dimensional food transportation network system as the breakthrough point, from the four aspects, namely, connection hub, food transportation lines, food transportation network, management system to discuss the idea of constructing the three-dimensional food transportation network system. With the accelerated development of the market and industrialization, the food transportation industry is getting more and more obvious development. To strengthen the convergence of various modes of food transportation, so as to build multi-mode integrated three-dimensional food transportation system has become the international trend for the modern metropolitan area traffic coordination development.

Keywords: Four aspects, food transportation industry, network system

INTRODUCTION

Food transportation is one of the basic urban components, the urban food transportation problems are existed in all aspects of urban development; the economic organism of city life can be regarded as a complex social dependence in the urban food transportation system. The development of urban food transportation system is in an effort to make the function of the city to be effectively guaranteed, so as to meet the demands of some service organizations, enterprises and residents. The quality of service can also be provided by urban food transportation and the impact of traffic on the surrounding environment can depend largely on the development of the city itself as well as its street network. The intensification of economic activity, the social demand and the increase of the number of cars, which must be accompanied by the formation and development of the modern urban transport layout, therefore, it had a lot of difficulties (Linneker and Spence, 1996). For example, during morning and evening peak hours, it had traffic jams, moreover, the nearby regional environmental quality will get deterioration, there will have traffic congestion between the city and the rest area, public traffic road will have a lot of vehicles with mass concentration, the speed of food transportation must be very low. Under this situation, it is an urgent task to improve the traffic situation and improve the traffic efficiency by relying on the construction of new food transportation facilities to improve the traffic conditions.

Professor Ke Yue believes that: three-dimensional food transportation network is a kind of transport system, namely, including the railway, highway, waterway, aviation, pipeline and other means of

transport. Usually on the map, it can be regarded as a "concentrated network diagram, arranged in a crisscross pattern with various thickness". She simply summarized the three-dimensional transport network as the sum of the various modes of transport and did not emphasize the mutual integration between these modes of food transportation (Sasaki *et al.*, 1997). Therefore, based on this, the writer regarded it as a supplement to the three-dimensional food transportation network, which can be defined as follows: three-dimensional food transportation network is through action and efficient management system, the coordination and integration of all kinds of food transportation network by powerful food transportation hub, the city passenger and goods, food transportation can be via a hub traffic conversion between different food transportation modes to achieve a seamless docking, so as to form a multi-model combination of comprehensive food transportation system. It is a complete system, which can have the effect of $1+1>2$. In order to distinguish it from the narrow sense of "three-dimensional food transportation network", in this study, it will use the term "three-dimensional food transportation network system".

MATERIALS AND METHODS

The elements of three-dimensional food transportation network system: The three-dimensional food transportation network system can be including "point, line, net, body", so as to form a coordinated operating system, which can constitute an organic system, so as to realize the function of the whole structure. It is composed by four elements: the function of a powerful connection hub, a wide range of food transportation lines, the structure of the perfect

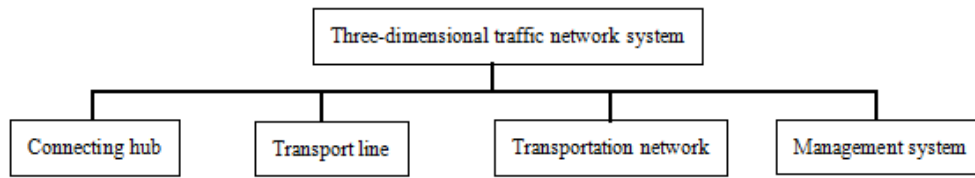


Fig. 1: The composition elements of three-dimensional food transportation network system

food transportation network, efficient operation of the traffic management system. The schematic diagram of the framework can be shown below in Fig. 1:

- **Firstly, the connection hub with powerful function:** It is the main points of the three-dimensional food transportation network. Through the planning of the hub, it can connect a variety of transport networks, in the hub, it can complete the conversion between different modes of food transportation.
- Secondly, a wide range of food transportation lines, which can be regarded as the fundamental of the three-dimensional food transportation network. Solid food transportation network is a system, to build this system, it is necessary to have a sound, coverage with a wide range of food transportation lines. Without lines, there will be no connection, no network (Hansen, 1959).
- **Thirdly, food transportation network with a perfect structure:** It can be regarded as the basis of three-dimensional food transportation network. Aviation, railway, highway, public food transportation and other modes of food transportation can be developed to improve this function, covering a comprehensive food transportation network, so as to meet the needs of various modes of food transportation.
- **Lastly, the management system with efficient operation:** It can be regarded as the strengthening of the three-dimensional food transportation network.

The architecture of three-dimensional food transportation network system, in general it can be regarded as "connection with points", "lines connected with things", "network with structure", through reasonable gradation hub of convergence, it will cover a wide range of connected food transportation lines, so as to form an integrated three-dimensional food transportation network, ultimately in the unified management, it can constitute a complete system. It has realized the connection between the external traffic and the internal traffic, as well as the inside of the internal traffic. Moreover, in the hub, the formation of a variety of modes of food transportation in the space can form three-dimensional separation, with the integration of functional integration model. Here are four elements to analyze how to build the "four in one" three-dimensional food transportation network system.

RESULTS AND DISCUSSION

Constructing powerful convergence hub: In order to create a three-dimensional food transportation network system, the first thing to do is to build a strong convergence hub, so as to ensure seamless food transportation hub (Zakaria, 1974). Therefore, in order to ensure the construction of the food transportation hub of the entrance, it must have reasonable layout and food transportation facilities, so as to improve traffic equipment and provide a variety of convenient food transportation such as, subway, bus, port, wharf, light rail, the parking lot, railway station, airports, self-stations and other food transportation hubs (Fig. 2) to achieve the seamless connection, so as to facilitate the long and short distance passenger with zero distance transfer.

Constructing a wide range of food transportation lines: In order to build three-dimensional food transportation network system, it is necessary to clear the mode of food transportation with the pros and cons of various departments in the coordination under the premise of consistent, with reasonable layout of each line, therefore, speeding up the construction of railways, highways, waterways and other lines is very necessary. Only in this way can we realize the municipal roads, highways, expressways, urban branch, underground passage, urban rail transit, the national railway, as well as the intercity railway, which can have good convergence and realize the integration of internal and external traffic. Thus, it is necessary to continue to deepen the expansion of the scope of the lines, the focus of the two rings, so as to get through the broken road and construct the new routes and form a more complete network (Fig. 3).

Constructing perfect food transportation network: In order to build a three-dimensional food transportation network system, it is necessary to adhere to the overall planning, unified deployment and management, so as to strengthen the connection between aviation, waterways, railways, highways and urban traffic integration, as well as its development and cooperation and improve the facilities and the route convergence, so as to form an organic whole system between the various food transportation during this process, ultimately, it can form a crosscutting food transportation network diagram. Therefore, it is necessary to construct the network. The so-called network construction, its essence referred to "series of

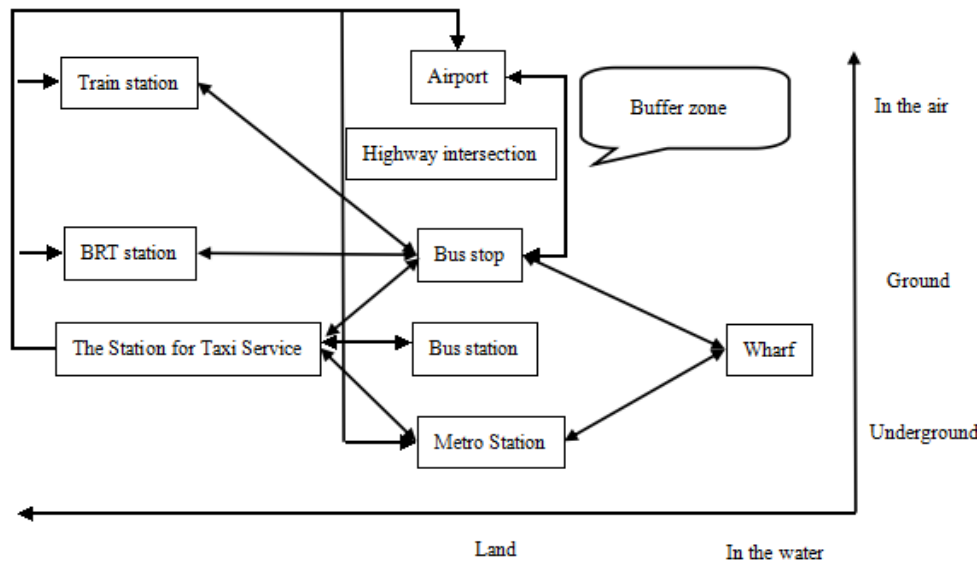


Fig. 2: Schematic diagram of the connecting traffic hub

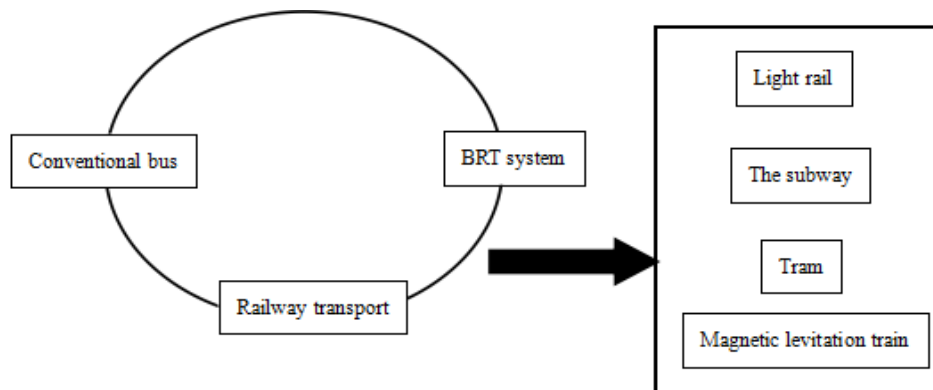


Fig. 3: The composition of urban public food transportation system

combination, inter-operation ability, integration and sharing", namely: not only in the vertical completed line, it should be within the system with the series of combination, it also should be regarded as a system of sharing with the completed inter-operation ability and integration with different lines (Gimpel and Schuknecht, 2003). Therefore, considering the height of the network system, it should realize the implementation of vertical and horizontal two-dimensional planar construction between the lines with different systems or different lines within the same system; in order to construct the network, it should construct the lines, as well as line network, so as to realize the combination of "line plus plane". This model can be conducive to the construction of the line itself, which also can be conducive to the construction of the network system.

Constructing efficient operating management system: Taking the existed food transportation control system, such as Guangzhou City as an example, the

tasks of city public traffic planning, building and operation are charged by the City Planning Bureau, the Municipal Construction Committee and the Municipal food transportation Committee, city food transportation police detachment, municipal corporation and other departments respectively. Among them, the public food transportation infrastructure construction, regulatory and the related funds are charged by the city building department; while the Municipal Committee of communications subsidiary food transportation Management Bureau is responsible for road food transportation industry management; ferry and shipping management, shipping management work is charged by the municipal port authority.

CONCLUSION

The purpose of developing urban food transportation system is to make the function of the city be effectively guaranteed, so as to meet the demands of the organizations, enterprises, as well as the demands of

the residents. The quality of service that is provided by urban traffic, as well as the impact of traffic on the surrounding environment should depend largely on the development of the city itself and its street network. The urban food transportation efficiency should depend on the network structure of the urban internal food transportation. The structure of the urban food transportation system can have influences on the overall development of the city. Therefore, making comprehensive and reasonable analysis on the urban food transportation system can provide a good reference for the development of the city.

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