Prediction Method to City Bridge Traffic Volume

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ABSTRACT

This article mainly research in the prediction of city traffic bridge, using regular travel rate method of urban road are commonly used with highway traffic investigation method commonly used, to extract The purpose of this predicted.

Keywords:urban bridge traffic characteristics; traffic volume prediction; travel rate method

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INTRODUCTION

Around to speed up the social and economic growth in recent years, urban road construction, improve the road network layout. Prior to the construction of the road traffic volume forecasting is an important part of the proposed road project proposal and feasibility study, is to determine the size of the proposed project and standard of the deciding factor. For city across the river (jiang) channel, the channel volume forecast is extremely important to bridge urban planning layout, urban planning is the main basis of river-crossing facilities. Due to the complexity of urban road network, regional population, large amount of travel, basic data investigation multifarious, city bridge traffic volume forecast has always been difficult, difficult to accurately predict. This article mainly research in the prediction of city traffic bridge, using regular travel rate method of urban road are commonly used with highway traffic investigation method commonly used, to achieve the purpose of accurate prediction.

TRAFFIC CHARACTERISTICS OF URBAN BRIDGES
For city across the river (jiang), due to the rivers, urban area formed in the river on both sides of the general number of groups, group transportation mainly bridge connection on both sides. The distribution of urban Bridges decided to the development of the city layout, the bridge on both sides of the general development of the city. With the rapid development of economy, central bridge traffic pressure increases gradually, some has become a central area of the traffic bottleneck, so many cities to reduce the pressure of traffic, and newly built across a river (jiang) bridge (tunnel). City traffic bridge main connection bridge on both sides of the group, at the same time take part in and out of the city traffic, belong to the long distance transportation in mixed with short distance transportation.

CITY BRIDGE TRAFFIC VOLUME PREDICTION METHOD DISCUSSED IN THIS PAPER
Road traffic volume forecast method generally used four phase, mainly for the traffic trip generation and attraction, trip distribution, transportation and traffic assignment four aspects. City bridge traffic volume forecast, generally based on the four phases of travel rate method, according to the rate of residents travel to predict, but fixed number of year of the urban planning generally shorter, the project's operation in 20 no related planning data, prediction data distortion. Highway traffic volume prediction based on general traffic survey method, the four phases of but is not suitable for urban road network, because of the bridge has a wide area of influence, survey data and complex, the actual forecast results are inaccurate. So this article, according to the particularity of urban bridges based traffic

survey data, combined with urban planning and comprehensive urban roads and road travel rate method commonly used traffic survey method, by contrast the complementary analysis and adjustment, to predict the regional channel traffic volume and plans to build a bridge across a river traffic.

THE INDUCED TRAFFIC VOLUME CALCULATION MODEL

The establishment of the induced traffic volume calculation model because of the induced traffic volume has lag and limitation of these two main features, and its formation, development and changes go through rapid growth and gradually stable three phases, so its change law can be used as shown in figure 2 to characterize the growth curve. In the growth curve of the mathematical model is: type: y for induced traffic volume forecast; T is time variable (a); K for induced traffic volume threshold value; A and b for the model parameters. In figure 2, on the curve of inflection point shows that the induced traffic volume of hysteresis, threshold value shows that the induced traffic volume of finiteness, regional performance in different parts of the induced traffic volume calculation model of the upper limit value of the inflection point position and different.

THE DETERMINATION OF STATUS QUO OF THE INDUCED TRAFFIC VOLUME

In view of the induced traffic volume difficult to discriminate , we must find an effective method, in the status quo of traffic data to rid of the induced traffic volume, and calculation model for calibration. The three parts of the highway traffic volume, the transfer traffic volume contains two aspects, namely the railway traffic and transferred the original road traffic. For the highway system, the original road traffic transfer is an internal transfer, transferred and railway traffic volume is the external transfer. If is to consider highway system, then transfer traffic volume is transferred by the railway. As a result, the whole channel and the induced traffic volume of: type Qu for channel induced traffic volume; Qn for channel highway measured traffic; Q0 for channel measured traffic of Original road; Qt for railway traffic; Q '0 for channel without the highway, trend prediction traffic.

QUANTITATIVE CALCULATION OF INDUCED TRAFFIC VOLUME

Induced traffic volume calculation and analysis of zhengzhou Yellow River bridge traffic throughout the years, the condition of social and economic development data from the Yellow River bridge assessment report. According to the highway over the induced traffic volume data, calibration of induced traffic model, Get the chengyu expressway for induced traffic volume forecasting model is: type t for predict fixed number of year, t = 1, 2,? ; K = 7, 000, by the algorithm. Use of induced traffic volume forecasting model to calculate the future year increment, and painted trend diagram (figure 3). From figure 3, you can get the following conclusion:

CITY BRIDGE TRAFFIC VOLUME PREDICTION METHOD INSTANCE

Below according to the traffic volume forecast of zhengzhou Yellow River bridge as the example, introduces the travel and the rate of traffic survey method of traffic volume prediction method. Zhengzhou Yellow River bridge is located in the south of zhengzhou city, across the xiangjiang river, regional situation with Tian Yuan bridge and Jian Ning bridge. Project features for 2015, 2020, 2025 and 2034, four year. Traffic volume forecast is divided into two phases, the first use of general urban bridge traffic volume forecast of commonly used travel rate method, according to the nature of urban planning of regional land use and population and residents travel rate prediction in 2020 proposed bridge traffic, then recycling road traffic investigation method commonly used, according to the traffic survey data and the regional economic development level and elastic coefficient method to predict 2034 proposed bridge traffic volume and traffic total across the river channel.

Figure 1 and figure 2 proposed maple creek bridge respectively , present status and road network plan of 3.1 in travel forecasting proposed bridge in 2020,which the rate of traffic status quo of road network layout according to the scope of the project research. combining the condition of regional road network planning and land use planning, the whole study area is divided into seven regional transportation, including 38 internal community. Project traffic generation forecast according to the area of each district population were predicting the amount of travel number and travel to attract after traffic OD matrix is obtained, using the double restraint gravitational model for trip distribution prediction, prediction on the basis of urban residents travel way, in the travel and attraction, trip distribution, travel way divided three stage is completed, considering the present situation of zhuzhou city road network traffic peak hours, the 2020 residents of trips into vehicles, using the user equilibrium traffic assignment model, the supply to the planning road network, the proposed bridge traffic in 2020.

Tab.1: Residents travel mode structure

Mode Year	Walking (%)	Bicycle (%)	Bus (%)	cars and other(%)
2020	22	12	40	26

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Tab.2: The findings of the current traffic amount

Survey point number	Cars	Bus	Minivan	MGV	Large trucks	Trailer truck	Absolute value	Discounted value
XX Bridge	24918	823	791	686	485	27732	27732	29030
XX Bridge	3509	85	196	735	967	5891	5891	8068

Channel traffic volume and predicted using traffic survey in 2034, plans to build a bridge across the river traffic channel traffic volume in 2034 and plans to build a bridge to predict the traffic using the method of traffic investigation, first of all, the proposed bridge upstream and downstream of the bridge traffic status quo investigation, according to the forecast of economic growth and the elastic coefficient, calculate the characteristic in the van of traffic growth, that is allocated according to the situation of road network planning in the future, predicted the plans to build a bridge across a river channel traffic volume in 2034 and traffic. Affecting the TianYuanbridge and JianNing rather bridge traffic investigation, traffic is shown intab.3

Tab.3: Area of influence future bus and lorry elasticity and growth rate

Characteristics year		2015		2020		2025		2030		2034	
Number	Name	Bus	Lorry	Bus	Lorry	Bus	Lorry	Bus	Lorry	Bus	Lorry
1	Elasticity	1.2	1	1.1	0.9	1	0.8	0.85	0.65	0.7	0.5
2	Growth rate	14.4%	12.0%	10.9%	9.1%	8.6%	7.0%	6.5%	5.9%	5.1%	4.6%

Prediction using elastic coefficient method, transport elasticity coefficient is the ratio of volume growth rate and economic growth, according to the forecast of economic growth and the elastic coefficient, calculate the van traffic volume growth in the future.

Predict traffic flow analysis and adjust according to the above analysis, with travel forecasting proposed bridge traffic in 2020, the rate of using traffic volume and traffic volume survey method to predict channel in 2034 proposed bridge traffic, through comparison of the two methods of adjusting and complementary analysis, finally determine the proposed bridge and regional traffic across a river channel. The concrete is shown intab. 5.

Tab.4: The results of traffic forecast results

Year		2015	2020	2025	2034
The total traffic of channel(pcu/d)		126781	196864	293298	427776
Among	XX Bridge sharing (pcu/d)	19702	30593	45578	66476

CONCLUSION

This paper mainly research on urban traffic volume prediction method of bridges, within the period in city planning, based on the four phases of travel rate prediction method, using the population of the city planning and land use nature to predict land bridge traffic, based on traffic flow outside the fixed number of year of the planning method to predict the four phases of investigation, at the same time, the traffic volume survey method is adopted to predict city across the river channel traffic volume over a large area, a complementary comparison analysis and comprehensive adjustment get the final forecasting result, ensure the accuracy of prediction.

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