



The Development and Practice of China Highway Capacity Research

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Abstract

The achievements of the project “highway capacity research” in the “9th Five-Year” period in China have supported the current “Technical Standard of Highway Engineering” and “Design Specification for Highway Alignment”, which are the most important specifications for the design and construction of highway in China and guidance of the construction and operation of tens of thousands of kilometers of highway. At present, China’s highway industry is still in a period of rapid development. By the end of 2014, the total mileages of highway network exceeds 4,400,000 kilometers, of which the freeway’s mileage reaches 112,000 kilometers. With this rapid development of highway system, since the “9th Five-Year”, the highway capacity research in China is still ongoing.

This paper provides a brief introduction of research history, on-going research and future work of highway capacity research and application in China. According to the paper, four major stages of highway capacity research in China are proposed. Stage 1 (before 1990) is called the beginning stage. Stage 2 (1991-2000) is extensive research stage, in which large-scale research was conducted based on the foreign advanced practical experience, such as USA’s. Stage 3 (2001-2010) is in-depth focus on important facilities, and stage 4 (2011 till now) is the adjustment and updating of achievements stage. The paper also introduces the representative research projects and achievements of each stage.

Besides, the paper also presents the current achievements of China Highway Capacity Manual (CHCM) which is still in draft. The structure of the manual as well as the newly added contents such as the capacity analysis of work zone is introduced. The paper mainly introduces the achievements of the chapter about basic expressway section in CHCM, which include the new speed – volume relationship on freeway, the level of service index and classification, and vehicle classification and equivalent coefficients as well as capacity analysis procedure and method.

Finally, the paper introduces the prospect of future direction of capacity research in China, such as traffic characteristics and dynamic change of capacity under huge volume with free passage in holidays etc.

Keywords: Highway Capacity, Speed/Flow relationship, Level of Service (LOS)

1 Development of Highway Transportation in China

In recent years, China has made remarkable achievements in highway construction, which has greatly promoted the incensement of road transportation. By the end of 2014, the total mileage of highways in China had already reached 4.46 million kilometers, while the mileage of freeway has reached 112,000 kilometers, as shown in Figure 1. Highway network, which takes the freeways as the framework, the other highways as the main body, has been formed. In the blueprint of “National Highway Network Planning (2013-2030)”, the total size of the highway network will be 5.8 million kilometers, in which the mileage of national freeways is about 118,000 kilometers, mainly consisting of 7 radiation lines from Beijing, 11 north-south bound lines, 18 east-west bound lines, as well as regional ring roads, frontage lines, and connecting roads, etc. Besides the rapid development of road network, China’s current motor vehicle population has reached 260 million, and number of motor vehicle drivers has reached 250 million, as shown in Figure 2. Therefore, China is experiencing the stage of rapid development. Accompanied by the development of China’s highway construction and motorization, the research and practice of highway capacity is continuously developing and enhancing.

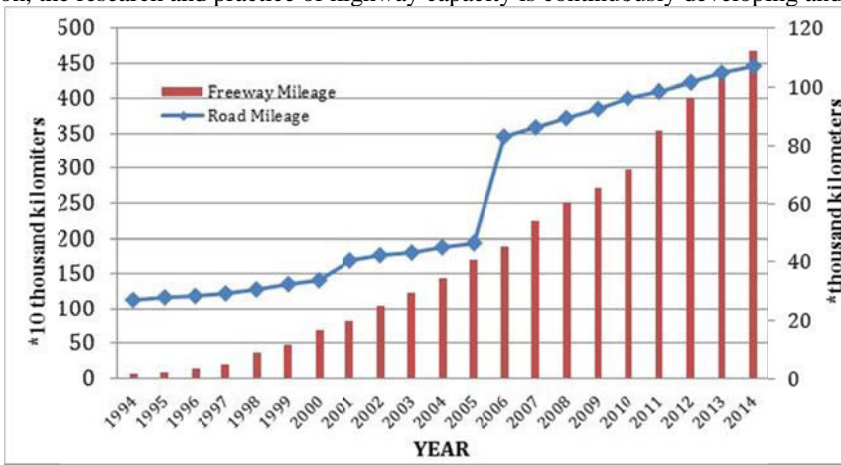


Figure 1: Mileages of highway and freeway (data of rural road has included since 2006)

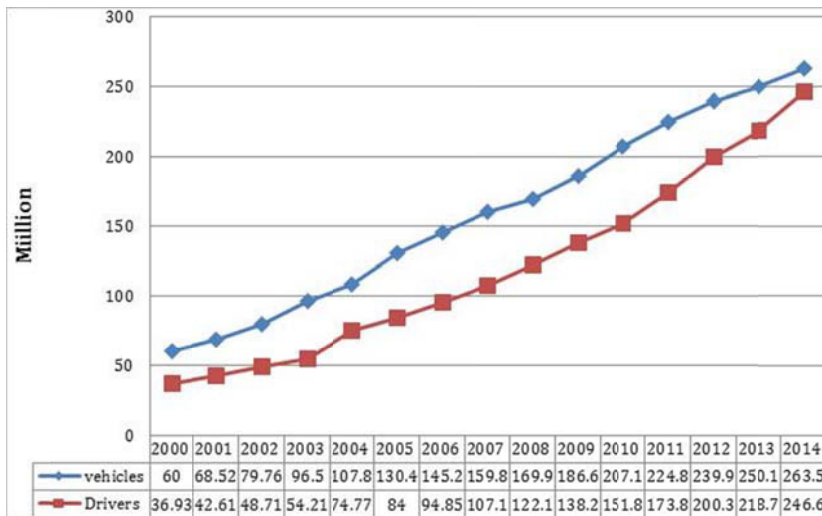


Figure 2: Population of motor vehicles and drivers

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