Construction and Maintenance of Railway Infrastructure in Complex Environment

Edited by
F. CHEN, L. GAO, L. J. WANG & X. P. CAI

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Preface

As one of the five Jiaotong Universities in China, Beijing Jiaotong University (BJTU), whose predecessor was Beijing Railway Management Training Institute started in late Qing Dynasty in 1896, is the first higher education school producing talent in management and the origin of Chinese modern railway technology and management expertise. The development of BJTU can manifest the development of Chinese railway technology and the rise up of China. The alumni of BJTU have made a great contribution to the progress in economy, culture, science and technology, especially in railway engineering of China and the world as well.

Rapid development of railway is ongoing in China. Chinese government has invested a lot in high-speed railway, heavy-haul railway and urban rail transit. According to "Medium and Long-term Railway Network Plan" revised in 2008, the development will focus on the "four vertical and four horizontal lines" and make them the framework for a fast, convenient and large-capacity passenger transport channel, in order to realize separate transport for passengers and goods. By the end of 2013, the operating mileage of Chinese high-speed railway lines reaches 11,000 kilometers, and the mileage under construction reaches 12,000 kilometers, which ranks first in the world. Meanwhile, China will continue to develop heavy-haul railway so that it can make full use of its economic benefits. Currently, urban transit is going through a rapid expansion in China and becoming the major public transportation option in urban areas. By the end of 2013, there are 87 lines of urban transportation railway in 19 cities, and the mileage is 2,539 kilometers. In the next decade, Chinese railway transportation market will construct 7,395 kilometers subways, of which the total investment reaches 3,800 billion RMB. By the end of 2020, there will be 177 subway lines in 33 cities in China.

The first twenty years in the 21st century is a great period for China to develop both in economy and society. The construction of infrastructure, in which the transportation facility plays an important role, has come to the new peak at present. According to the mid-term and long-term plans considered by the State Council, in the construction of railroad, the national length of railroad in service will be up to more than 120,000 kilometers in the year of 2015 and the net of express railroad will cover all provincial capitals and 90% of cities with over 500,000 populations. In the construction

of urban railway system, our country has permitted 29 cities with 96 lines and the total length is 2,200 kilometers. It is estimated that the total length of urban railway will reach 3,000 kilometers.

The most vital part is to ensure safety. Besides the factor of vehicle, the railway is also confronted with a series of complex operating conditions, among which they have interacted and transformed, where exist uncertainty, randomness and unpredictability, such as the train load, weather conditions, and bad geological conditions. Furthermore, the rising speed of high-speed rail, the increasing load of heavy haul railway and the promotion of traffic density of urban transit all raise higher request for rail infrastructure. So paying more attention to the safety of railway engineering is very urgent.

The conference aims to provide a high level academic exchange platform for experts and scholars at home and abroad who engage in high-speed and heavy-haul railway, as well as in the fields of city track traffic engineering, strengthen academic exchanges among domestic and foreign experts and scholars in the field of railway engineering, promote the development of domestic railway engineering disciplines and provide a powerful technical support and security for the construction of track engineering in China. Session topics cover diverse research directions on railway engineering. The conference hosted by the Beijing Jiaotong University and Beijing Key Laboratory of track engineering is held in Beijing (August 2-3, 2014).

This symposium includes 128 papers. The content involves almost every aspect of railway engineering, and audited by the relevant experts. At the same time, the meeting group sincerely thanks all the authors for actively participating in this conference. The papers concern all areas of railway engineering and have been reviewed by relevant experts. We want to extend our cordial thanks to all authors. Meanwhile, our gratitude also goes to members of our scientific committee from China, United States, Russia, Japan, Netherlands, Spain, Germany, Australia, China Taiwan, China Hong Kong and to our partners co-organizing this conference: China Railway Society, National Natural Science Foundation of China, China Railway Corporation, China Association of Metros, Southwest Jiaotong University, Central South University, Jiaotong University of East China, Shijiazhuang Tiedao University, The Hong Kong Polytechnic University, International Association of Chinese Infrastructure Professionals, Columbia University in the city of New York, Texas Transportation Institute, Moscow State University of Railway Engineering, Siberian Transport University, Spanish Railway Association, Beijing Urban

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Chairman of ICRE2014
Vice President, Professor
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