The Development of China Railway Standard Internationalization Work

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Abstract:Based on its rapid development and complete technical standard system, CHINA RAILWAY has promoted standard internationalization work actively. CHINA RAILWAY is now an important active force in UIC international standard work, and has realized twinned leadership and project advantage in ISO/TC269. Meanwhile, CHINA RAILWAY tries to enlarge standardization cooperation with other countries and implement its standard system in overseas railway projects. Technical standards are becoming an important aspect of China Railway's active service in The Belt and Road Initiative.

1 Introduction

With the continuous development of the economy globalization, the degree of interconnection between major global economic entities is deepening. Railway plays a significant role in promoting facility communication among countries. Railway, as an economic and environmental transport mode, as well as one modern industry integrated advanced information technologies, has caught more attraction worldwide.

In recent years, China railway has achieved rapid development. By the end of 2018, the business railway mileage in mainland China reached 131,000 kilometers, of which the high-speed railway business mileage exceeded 29,000 kilometers, accounting for more than 60% in the world.

Based on the scientific and technological innovation and development, China railway has established its technical standard system, which consists of standard systems for high-speed, heavy-haul and conventional railway. Meanwhile, CHINA RAILWAY is helping many emerging countries like Indonesia, Lao, etc. to build its railway projects such as the Jakarta-Bandung High-speed Rail under the framework of The Belt and Road Initiative. Railway standards play a more and more important role in technical negotiation, cost accounting, design, implementation, quality control and personal training. Promoting China railway's technical standard system internationally and sharing more experiences worldwide is one important work carried out by CHINA RAILWAY to promote railway interconnection with the Belt and Road countries.

Currently, China railway experts have actively participated in the formulation and revision of international standards of UIC (International Union of Railway) and ISO/TC269 (Railway Application Technical Committee of International Standard Organization), and continuously shared experience with experts worldwide. CHINA RAILWAY is also actively carrying out bilateral and multilateral exchanges at the standard level with other countries in the world.

2 Important active force in UIC International Standard Work

Founded in 1922, UIC is the oldest and most influential international union in railway sector. China Railway, as well as other 200+ railway organizations bureaus and institutions are now UIC member units. UIC is also the earliest organization to formulate railway international standards. Its standards have two forms: Leaflet and IRS (International Railway Solution). UIC standards focus on the overall railway system design framework, railway system integration, railway operation and maintenance, railway technical compatibility and so on.

With years of active work and contribution, CHINA RAILWAY now works as the member of the UIC Railway System Forum (RSF) Steering Board and the Standardization Platform Core Group, and assumes the duties of Chairman of UIC Asia-Pacific Region and Vice-Chairman of Intercity & High-speed Committee.

China railway experts have led the formulation and revision of UIC standards majored in High-speed railway planning & design, High-speed railway system testing and maintenance, High-speed EMU braking, High-speed EMU networking, Power supply & Overhead Line, etc. By the end of 2018, CHINA RAILWAY has hosted 23 standard projects and participated in another 22 ones, some of them have been published such as Diagnostics on passenger rolling stock (UIC 557:2015), Railway application—High speed—Dynamic integration tests and trial operation before revenue operation (IRS 70001:2016), Railway Application—Fixed installations—Diagnosis of the OCL conditions (IRS 70015:2016).

In these standards, CHINA RAILWAY has shared many effective and useful parameters, methodologies that have concluded in China railway standards, such as *Code for Design of High-speed Railway* (TB 10621). During the formulation process, China experts have discussed and negotiated with experts from various countries, and all contents are determined with consensus.

The contribution of CHINA RAILWAY in UIC standardization work has been recognized by Director-general Mr. Jean-Pierre Loubinoux of UIC and other officials. In the near future, China railway will also contribute to the UIC standard work in railway digital implementation, corridor design & interconnection, railway intelligence, multimodal transportation, and work more closely together with experts from other countries.

3 Twinned Leadership and Project Advantage in ISO/TC269

Established in 2012, Railway Application Technical Committee (ISO/TC269) is the only ISO technical committee majored in railway application. It has now three sub-committees (SCs), which are respectively Infrastructure (SC1), Rolling Stock (SC2), and Operations & Services (SC3).

With the support from SAC (China Standardization Administration of P.R.C), CHINA RAILWAY became the P (active) member of ISO/TC269 since its foundation, and hosted the 4th plenary meeting in Beijing in 2015.

CHINA RAILWAY now takes major leadership in ISO/TC269 as the Twinned Secretariat of SC1 (France as the Leading Secretariat) and Vice Chairman of SC2.These two SCs have assumed 82.6% of all ISO/TC269 standard projects, and jointly become the backbone of the overall development of ISO/TC269.

By the end of 2018, Chinese experts had participated in all 23 working groups (and Ad hoc groups) of ISO/TC269, and led the formulation of ISO standards including *Track Geometric Quality* (ISO 23054),*General Requirements and Test Methods for Rail Welding* (ISO 23300), *Body Side Windows for Railway Rolling Stock* (ISO 22752), etc. The number of working groups (Ad hoc groups) and standard project sled by CHINA RAILWAY accounted for 1/4 of the total number, ranking CHINA RAILWAY as first among all active members of ISO/TC269. CHINA RAILWAY has formed a certain project advantage in ISO/TC269.

4 Extensive Bilateral Standardization Cooperation

Railway is an important part of China's infrastructure interconnection with The Belt and Road regions and countries. Technical standards play an important basic role in railway interconnection.

Since 2013, railway has been identified as one of the four priority areas of Sino-French standardization cooperation. In November 2015, representatives of China and France signed the Road Map for Sino-French Railway Standardization Cooperation. Under the guidance of the road map, China and France have set up an expert group on railway standardization, and have regular meetings to jointly promote the exchange of experience and information sharing in railway standardization between China and France.

Furthermore, under the leadership and organization of SAC, representatives of CHINA RAILWAY also participated in the meetings of the Sino-British, Sino-Russian and Sino-German bilateral standardization cooperation committees, actively introduced the development achievements of China railway and put forward proposals for bilateral standardization cooperation.

5 Widely Implemented in Overseas Railway Projects

Many important railway projects constructed by Chinese railway enterprises implement Chinese technologies and technical standards of different grades according to the needs of projects. The Jakarta-Bandung high-speed railway adopts China's 350km/h high-speed railway standard system and ballastless track technology in an all-round way. China's 250km/h high-speed railway standard system and ballasted track technology are used in the Bangkok-Nakhon Ratchasima section of Thailand railway project. The first section of the Laos railway adopts China's conventional railway standard system and will directly connect with China's railway network. The Orange Line Project of Lahore in Pakistan adopts the technical standard of urban rail transit in China.

In these railway projects, while adhering to the adoption of Chinese technology and Chinese standards, the local natural environment, religious beliefs, customs and other factors are fully taken into account.

In addition to providing standard support for overseas project construction and manufacturing, China standards also provide relevant basis and support for quality inspection and certification, technology transfer and personnel training in the long term.

6 Conclusion and Future Work

In recent years, railway, especially high-speed railway in China, has developed rapidly. China railway has advanced technology and rich experience in construction and operation, and has established a mature technical standard system. Relying on its technical standard system, CHINA RAILWAY continues to promote standard internationalization and actively shares the technology, experience and standards achieved in China railway construction, manufacturing and operation with other countries in the world through the formulation of international standards. CHINA RAILWAY has actively assumed leadership positions in railway international standards organizations such as UIC and ISO/TC269, and continuously expanded the international influence and application of international standards issued by these organizations. Cooperation and exchanges on railway standards between China and several countries are under way.

Driven by the rapid growth of international passenger and freight transport, the acceleration of urbanization, the upgrading of existing transport systems and the expansion of new lines, the railway market will achieve sustained and rapid development in the future. Accordingly, the demand for railway international standards is increasing. Meanwhile, with the continuous application of new materials, new technologies and new products in the railway field, the continuous innovation of railway operation and management mode and the increasing demand of urbanization for integrated transportation and multimodal transport, a large number of existing railway international standards need to be updated and revised to meet the needs of the railway market.

CHINA RAILWAY will continue to expand its participation in UIC, ISO and other activities of railway international standard organizations, strengthen standardization cooperation with relevant countries. These efforts will enable more countries to better understand the basic framework and requirements of railway engineering construction, equipment and facilities, operation and management through international standards; they can also improve the internationalization of quality inspection, certification, conformity assessment and other related fields. On the other hand, standard internationalization activities can also promote further cooperation and coordination between CHINA RAILWAY and international counterparts, jointly promote the rational and orderly international railway market, further reduce the cost of global logistics and promote the prosperity of the global market.

Reference:

[1] *International Standardization Development Report 2016* [M]. Beijing: China Quality Inspection Public House.

[2] Chen Yuan, HuoBaoshi, Yao Jianwei, Zhao Xin. Dynamic integration tests and trial operation—the international railway standard and its implementation in China [J]. *Chinese Railways* (EN), 2016 (47):18-22.

[3] Zhou Hongyun, Zhou Yongzheng. International practice of technical standards for high-speed railway—study on compiling standard series of UIC high-speed railway implementation [J]. *Railway Economics Research*, 2017(5):1-7.

[4] Standards Mean Added Value and Coherence for Global Sustainability—Interview with Mr. Jean-Pierre Loubinoux Director-General of International Union of Railways（UIC）[J]. *China Standardization* (EN), 2016(6):18-22.

[5] TB 10621-2015, *Code for Design of High-speed Railway* [S], Beijing: China Railway Public House.