深化亚太铁路运输数字化高级别会议

High-Level Meeting on Deepening Digitalization of International Rail Transport in Asia-Pacific

Integration and Innovation of Chinese and Bangladeshi Railway Standards

--China Railway First Group Co., Ltd.



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1. Project Background

➢Background of the Padma Bridge Rail Link Project in Bangladesh

The Padma Bridge Rail Link Project in Bangladesh is 169.829 km long, combining broad gauge (1,676mm) and mix gauge (both 1,676mm and 1,000mm) . The Project was commenced in July 2018 and open to traffic in December 2024.







2. Significance of the Project

➢Significance of the Padma Bridge Rail Link Project in Bangladesh

Significance for Bangladesh:

- Connecting 5 existing railway lines and 21 districts in southwestern Bangladesh;
- Training more than 20,000 skilled workers in Bangladesh;
- Shortening the travel time from the capital Dhaka to Jashore from 10 hours to 3 hours;
- Benefiting 80 million residents and boosting Bangladesh's economic growth by 1.5%.









➢Significance of the Padma Bridge Rail Link Project in Bangladesh

Significance to regional economic development:

As one of the important routes of the Trans-Asian Railway Network, the railway is not only the "Dream Bridge" of Bangladesh, but also an important part of the Belt and Road Initiative. In the future, the railway will become a land route connecting China, Myanmar, Bangladesh and India, creating more opportunities for regional economic integration.







3. Integration and Innovative Practice of Railway Standards

➢Integration and Innovative Practice of Railway Standards

Overview of Bangladeshi railway standards:

Bangladesh does not have a systematic and complete system of railway survey, design, construction acceptance and manufacturing standards, and currently mainly follows Indian standards (IS) and British standards (BS). Indian standards (IS) are mainly used for subgrade works and track works, and British standards (BS) are mainly used for bridge and culvert structures and geological exploration, which are very different from Chinese standards.







➢Integration and Innovative Practice of Railway Standards

1. Ground treatment



Standard Differences: Bangladesh adopts British standards for rock and soil classification and testing methods, mainly including the cone penetration method and the rubbing method; In the Chinese standard, soil classification is mainly based on particle composition and plasticity index, and in addition to the cone penetration method and the rubbing method, the test method with Casagrande liquid limit device is also adopted.

Integration and Innovation Practice: To resolve the differences in geological exploration and more clearly identify the differences in soil classification and in soil horizon technical parameters between the two standard systems, strain gauges were installed around the test piles, and the strain values were measured through load tests, thus to accurately determine the ultimate frictional resistance and bearing capacity of the soil around the piles, and verify and correct the parameters in the geological exploration.



➢Integration and Innovative Practice of Railway Standards

2. Construction of transition section between bridges/culverts and the subgrade

Standard Differences: In order to reduce uneven settlement between bridges/culverts and the subgrade, the packed drain + preloading method is usually used.

Integration and Innovation Practice: Combined with the Chinese standard for ground treatment, the soft soil ground treatment methods of cement mixing pile (wet shotcreting) and reinforced subgrade were proposed. Through tests in different sections, the construction technique of "four-mixing and two-spraying" was finally determined, which solved the defects of unevenness and unsatisfactory integrity in pile formation at the project site and improved the uniformity of pile mixing.





3. Subgrade construction





Standard Differences: According to Indian railway standards, the thickness of the surface layer of the subgrade bed shall be 0.45m and that of the bottom layer of the subgrade bed shall be 1.0m, which are thinner than 0.6m-thick surface layer and 1.9m-thick bottom layer of subgrade bed in the Chinese standards. The ASTM compaction coefficient and Ev2 were adopted for subgrade testing, different from heavy compaction and K30 adopted in the Chinese standards.

Integration and Innovative Practice: By comparing the standards of the two countries, we figured out where the standards of the two countries could be integrated, fully considered the local materials for filling the subgrade bed, quickly selected the materials for the bottom and surface layers of the subgrade bed and determined the control indicators of the materials to ensure the quality of the subgrade bed.

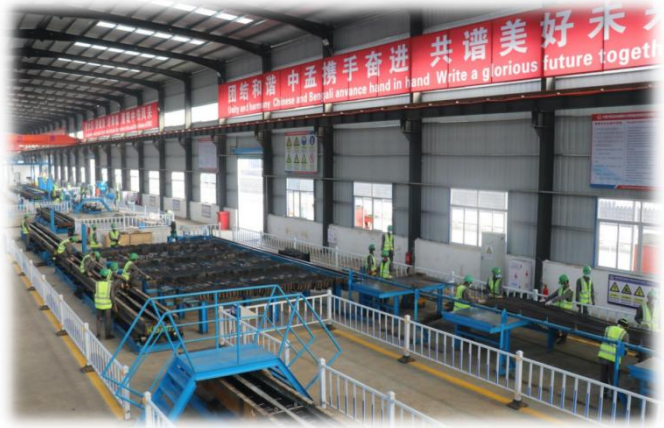
➢Integration and Innovative Practice of Railway Standards

4. Railway sleepers

Standard Differences: In the national standard of China, 1,435mm standard-gauge sleeper is adopted; Bangladesh adopts the Indian IS standard, in which, broad-gauge (1,676mm) and mix-gauge (1,676mm and 1,000mm) sleepers are adopted.

Integration and Innovative Practice: To ensure the design and production quality of sleepers, a sleeper design demonstration test was carried out in China to optimize the structural design of sleepers, and while meeting the requirements of the Indian standards, a sleeper factory with improved production line equipment and higher sleeper production efficiency was built in Bangladesh by integrating the Chinese standards.









➢Integration and Innovative Practice of Railway Standards

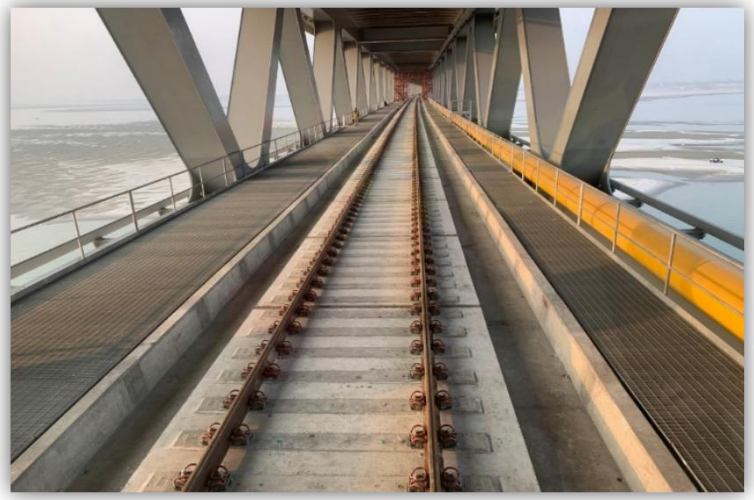
5. Ballastless track

Standard Differences: In the original design of the ballastless track, a cast-in-place sleeperless and ballastless track scheme was adopted, where the fastening system is directly cast into concrete track slabs, leading to the difficulty in controlling the construction accuracy, concrete cracking around the fastening system, and poor durability that can not meet the requirements for operation of 25t axle-load mixed passenger and freight railways with large traffic volume.

Integration and Innovative Practice: By referring to the application scenarios of ballastless track in Chinese railways, the long-sleeper embedded ballastless track with simple structure, sound integrity and strong gauge retention capability was finally selected after comprehensive analysis and comparison; The long-sleeper embedded track structure and supporting construction methods were also proposed to fill the gap for lack of ballastless track in South Asia.







4. Recommendations for the Integration of Standards for the Trans-Asian Railway Network

➢Recommendations for the Integration of Standards for the Asia-Pacific Railway Network

Adhere to the principle of 'seeking common ground while preserving differences'. We should fully respect the differences in railway design, construction, and inspection standards among various countries, and actively explore scenarios where integration and innovation of standards can be applied, to ensure both the preservation of characteristics of standards of different countries and the practical operability.

Accelerate the application of results. In the construction practice of the Trans-Asian Railway Network, we have successfully achieved the integration and innovation of many different standards and obtained satisfactory social and economic benefits. At present, we urgently need to establish a mechanism for the transformation of results, refine and summarize the results, evaluate and verify the applicability, and then form a technical standard system for the Trans-Asian Railway Network..

Emphasize systematic promotion. Standard integration and innovation is a complex and systematic project, which requires the joint efforts of government sectors, industry organizations, research institutions, construction enterprises, and other stakeholders. To ultimately achieve the systematic integration of standards for the Trans-Asian Railway Network, we need to strengthen policy coordination and institutional alignment, promote mutual recognition of standards, and resolve discrepancies in standards.

➢Concluding Remarks

The Padma Bridge Rail Link Project in Bangladesh is not only a "steel link" in the physical sense, but also an innovative testing ground for collaborative governance of standards for the Trans-Asian Railway Network. By seamlessly integrating China's profound railway expertise with Bangladesh's actual needs, CRFG has not only verified the compatibility between standards but also explored a new route for the realization of infrastructure interconnectivity under diverse standard systems.

We firmly believe that under the coordinated efforts of the United Nations Economic and Social Commission for Asia and the Pacific (ESCAP) and the Global Sustainable Transport Innovation and Knowledge Center (GSTIKC), and with the joint endeavors of all participating member countries, the construction of the Trans-Asian Railway Network will enter a new stage.

CRFG is willing to maintain deep collaboration with all parties, to contribute our corporate strength to the development and construction of the Trans-Asian Railway Network.


Thanks