

## Standard Defining Basic Specifications for High-Speed Trains Wins UIC Publication Award Publication of Worldwide Industry Standard IRS 60660 Reflecting Technical Specifications of Japan's Shinkansen

- East Japan Railway Company (JR East) has been working on standardization activities to incorporate Japanese technology into international and worldwide industry standards related to railways, aiming to expand sales opportunities in the overseas railway market. One of our commitments in these activities is to reflect the technical specifications of Japan's Shinkansen in the industry standards called IRS<sup>1</sup>, International Railway Solution, published by the International Union of Railways (UIC<sup>2</sup>).
- IRS 60660 is a standard that defines the basic technical specifications for high-speed trains. JR East participated in the standardization working group for this standard. Over the course of two years, we successfully incorporated the technical specifications of Japan's highspeed trains, specifically Shinkansen vehicles, into IRS 60660. This achievement was published in May 2024.
- In recognition of its excellence, IRS 60660 received UIC's EXCELLENCE IN RAILWAY PUBLICATIONS AWARD. The awards celebrate outstanding UIC publications, such as technical specifications, guidelines, and IRSs. The award ceremony was held on October 15, 2024. IRS 60660 was awarded for the second time after IRS 60682<sup>3</sup> in 2022, among the IRSs that JR East contributed to.

<sup>1</sup> The IRS is an industry standard developed and published by UIC for the railway sector. Since 2013, a migration project has been underway from the IRS Leaflets, the precursor documents, to the IRS. The published IRS reached 230 as of December 2023.

<sup>2</sup> Founded in 1922, UIC is an international organization of railway operators based in Paris, France, with 218 railway-related organizations from 84 countries worldwide. UIC develops and publishes industry standards for the railway sector to facilitate smooth and efficient international railway operations.

<sup>3</sup> IRS 60682 is an international standard published in June 2022, specifically for the electrical installations of high-speed rail.

- 1. Excellence in Railway Publications Awards
  - JR East has been actively incorporating Japanese technology into international and industry standards related to railways and adapting some Japanese methods and technologies to existing international standards. IRS 60660, one of the activities we engaged in, received the EXCELLENCE IN RAILWAY PUBLICATIONS AWARDS. This award is granted by UIC to the most outstanding UIC publications released from July 2023 to June 2024. The award ceremony was held on October 15, 2024.
  - The awards aim to support and promote excellence in creating user-friendly and business-relevant publications that enhance the efficiency of railway operations. Submitted publications are assessed for their quality, readability, consistency of terminology, experts' contribution in the working group, the innovativeness of the topic covered, and the importance of the topic to railway operations.
  - IRS 60660, a standard publication that JR East contributed to its development and discussion, received the second award from UIC. This follows the success of IRS 60682 in 2022, which focuses on power installations for high-speed rail trains.



Photo: Excellence in Railway Publications Awards Ceremony

[Press release of October 26, 2022: https://www.jreast.co.jp/e/press/2022/pdf/20221026.pdf]

- 2. IRS 60660
  - The award-winning standard, IRS 60660, defines the basic specifications of high-speed trains. In January 2021, a working group under the Intercity & High-Speed Rail Committee of the Passenger Forum of UIC launched a series of discussions on this standard. The initial draft of IRS 60660 was mainly based on high-speed train systems in Europe, with many descriptions that were not applicable to Japan's Shinkansen system.
  - Through a two-year-long process, JR East described the Shinkansen system, its unique characteristics and the differences in the design philosophy behind the Shinkansen system. This effort resulted in successfully incorporating the technical specifications of the Japanese Shinkansen system into IRS 60660.

## • Participants in the working group include six countries:

Japan, China (Chair), France, Spain, Sweden and India.

- · Two Main Technologies Introduced into IRS 60660 by JR East
- i. Changeover Section System

The unique function of the changeover section is to minimize unpowered time when a train passes through an electrical boundary, a neutral section, between neighboring sections in an overhead contact line system.

In some countries, coasting is used for trains to pass through a neutral section. In this system, when a high-speed train is powered, i.e., with traction power, the train needs to automatically switch from powering to coasting mode upon entering a neutral section.

Conversely, the changeover section system used in Japan allows for continued powering of high-speed trains while passing through a neutral section. This system eliminates the need for coasting in high-speed trains, as well as an onboard switching function that automatically switches into coasting, thus reducing acceleration time.

ii. Active Safety

The Japanese Shinkansen is designed mainly with the philosophy known as active safety in mind. This safety approach uses dedicated tracks separate from roads and advanced signalling systems to prevent collisions. The initial proposal of this standard referred only to passive safety, which ensures vehicle strength to withstand collisions.

The published version of this standard has incorporated the Shinkansen safety philosophy. The standard now includes two principles: The required safety level shall be achieved through a combined approach using both active and passive safety measures, and the necessary combination of active and passive safety measures may vary depending on the requirements of each country.