RTRI Develops New Master Plan RESEARCH 2030

The Railway Technical Research Institute (RTRI) developed its medium-term action plan, "Master Plan—Creating sustainable railway systems—RESEARCH 2030," for the five years from FY2025 to FY2029, an outline of which is presented herewith. The full text can be viewed on the website (at present only available in Japanese) of RTRI.

1. Introduction

The steady implementation of "Sustainable Development Goals (SDGs)" is being called for as social issues such as global environmental problems become more apparent. At an advanced level for the realization of a sustainable society, efforts are being made in various fields to achieve both economic development and resolution of social issues through systems that integrate cyberspace and physical space.

The environment surrounding the society, economy, and railways in Japan has been changing at an accelerated pace since the spread of the COVID-19 pandemic. Social issues such as climate change, the increased necessity of realizing carbon neutrality, and the decline in the working-age population have become more severe and complex. Specifically in the railway industry, labor shortages, aging infrastructures, and the business continuity of regional railway companies are urgent issues. On the other hand, technological innovation, particularly in digital technologies, is progressing rapidly in every field. The railway industry is also advancing in the utilization of such cutting-edge technologies, and collaborative efforts with railway companies and related organizations have become essential to address the increasingly complex challenges.

Based on the above circumstances, we formulated the Master Plan RESEARCH 2030 as an action plan to achieve our vision, "We will develop innovative technologies to enhance the rail mode so that railways can contribute to the creation of a happier society."

2. Basic Policies

For the "creation of sustainable railway systems," RTRI defined the following five basic policies (Table 1).

Table 1 Basic policies

(1) Improving safety with an emphasis on improving resilience against intensifying natural disasters ・ R&D for enhancing the resilience of railway systems against natural disasters, preventing failures of ground and vehicular equipment, and taking countermeasures against their aging ・ Promoting diagnostic guidance on investigations of damage and causes of disasters and accidents, and proposals of their recovery methods and prevention measures
(2) Improving productivity and decarbonization of railway systems ・ R&D that contributes to the improvement of productivity and decarbonization of railway systems through the active use of cutting-edge Information and Communication Technologies (ICTs) ・ Supporting the development of relevant laws, regulations, and technical standards, which are required for the social implementation of our R&D outcomes
(3) Providing solutions to various issues in railway technologies by demonstrating our collective strength ・ Establishing interdisciplinary research systems ranging from basic research to applied development to provide solutions to railway-specific issues ・ Focusing our resources on the core technologies for R&D, which serve as a driving force to elucidate the real nature of various railway-specific issues and to find solutions for them
(4) Enhancing the global presence of Japanese railway technologies ・ Technical collaboration with overseas railway operators and research institutes for stimulating R&D activities ・ Strategically engaging in standardization activities as a base for international standardization
(5) Creating a vibrant workplace where each employee can experience self-realization ・ Creating a workplace that fosters well-being where diverse values are respected and each employee can experience self-realization

3. Activities under RESEARCH 2030

(1) Research and Development

(a) R&D aims, pillars, approach, etc.

- RTRI established four R&D aims and three pillars of R&D to guide our activities (Fig. 1).
- When setting R&D projects, based on our roadmaps that include activities ranging from basic research to applied technology development, we will set up R&D projects to seamlessly promote R&D by accurately setting milestones on each roadmap.
- At the stage of development for practical use, we will actively support the development of laws, regulations, and technical standards, which are necessary for the social implementation of our innovative technologies.

- Our core R&D technologies serve as a driving force to elucidate the real nature of various railway-specific issues and to find solutions for them. We will focus our resources on such core technologies for enhancing the sophistication thereof.
- By promoting technical collaboration with different technical fields and railway companies, as well as facilitating data sharing and coordination, we will create new values, improve the quality of R&D outcomes, and shorten development periods.
- We will modularize our R&D outcomes as appropriate and promote social implementation in stages.

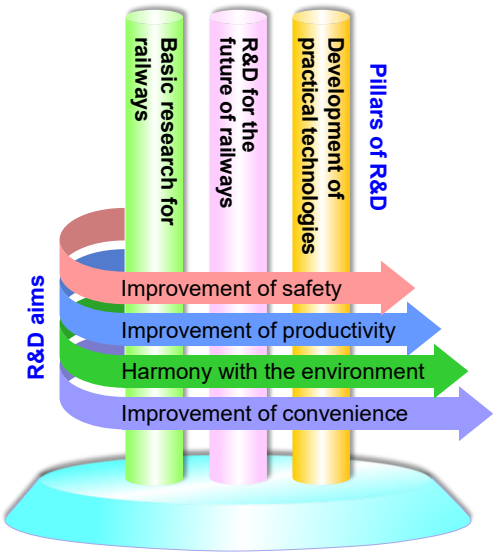

Fig. 1 R&D aims and pillars

(b) R&D for the future of railways

We will address five major research themes: “Enhancement of resilience against intensifying natural disasters,” “Sophistication of automatic train operation,” “Labor saving in maintenance,” “Decarbonization of railway systems,” and “Elucidation of railway-specific phenomena through simulation” (Fig. 2).

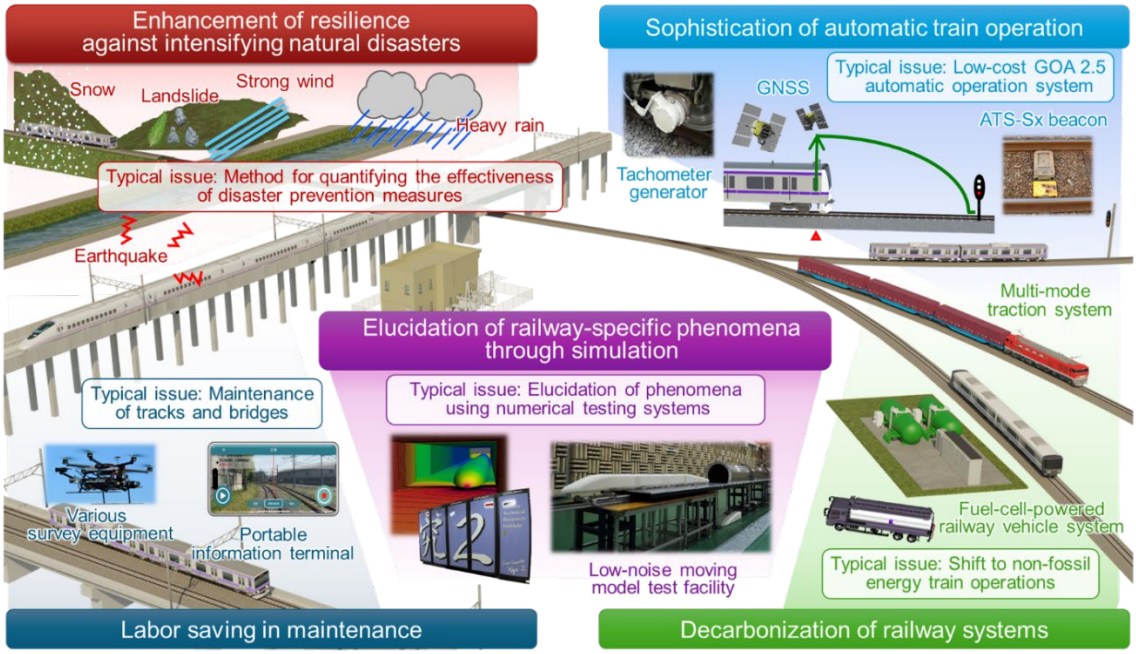

Fig. 2 R&D for the future of railways

(c) Development of practical technologies

To provide timely and accurate practical outcomes, we will implement projects for rapid resolution of various issues in railway operations, promoting R&D objectives such as “Improvement of safety” and “Improvement of productivity.”

(d) Basic research for railways

In basic research, which is the basis for innovative railway technologies such as those for elucidating railway-specific phenomena, we will advance challenging projects with high technical complexity and the potential to significantly impact railway operations if research outcomes are put to practical use.

(2) Diagnostics advisory

We will respond promptly, accurately, and meticulously to requests from railway companies. In particular, when providing support in response to disasters, accidents, and equipment failures, we will conduct swift investigations and propose recovery methods and prevention measures.

(3) International standards

We will promote strategic international standardization activities in ISO (International Organization for Standardization) and IEC (International Electrotechnical Commission), proposing to standardize new work items relating to technical fields in which Japan has an advantage, and incorporating Japanese design philosophies and technologies into standards proposed by other countries.

(4) International activities

We will promote and expand collaborative research with overseas universities, research institutes, etc. to stimulate our R&D activities. We will also actively support global expansion of Japanese railway companies.

4. Management

RTRI will strive for sound and appropriate business management through initiatives such as promoting legal compliance and strengthening information management. Moreover, we will aim for a vibrant business management such as by creating a workplace that fosters well-being where each employee can experience self-realization.

5. Conclusions

In response to increasingly serious, apparent, and complex challenges, RTRI will promote various activities to create a safe, secure, smart, environmentally friendly, and sustainable railway system in the future.

We will advance R&D by proposing its objectives and roadmaps for social implementation.

While maintaining close collaboration with railway companies and other organizations, we will fulfill our role as a leader and driver of technological innovation. We will also strive to sophisticate our R&D core technologies, leading to the creation of breakthrough innovation.

Based on the vision “We will develop innovative technologies to enhance the rail mode so that railways can contribute to the creation of a happier society,” RTRI will devote its full efforts to executing its activities.