

Outline of the New Master Plan (RESEARCH 2005)

Kiyomitsu MURATA

Deputy General Manager, Planning Division

Our new master plan, "RESEARCH 2005", designed to cover the five years starting with fiscal year 2005, has five basic activity policies: (1) The creation of railway technologies for the 21st century, (2) The display of integrated power as a railway engineering group, (3) Quick response to needs, (4) The communication of railway technologies to the next generation and accumulation of basic technologies, and (5) The dissemination of railway technologies and communication of railway-related information. On the basis of these policies, we intend to carry out various activities, including research and development (R&D).

1. R&D

In order to concentrate our power and effectively implement R&D activities in line with the basic activity policies mentioned above, we have set "R&D objectives" (Reliability, Convenience, Low cost and Environmental compatibility), which define the directions of our R&D, and "prioritized R&D objectives" (R&D for the future of railways, Development of practical technologies and Basic research for railways), which clearly shows the R&D items to be focused on (see Fig. 1).

(1) R&D for the future of railways

We shall positively tackle themes that will enable us to achieve technological breakthroughs for the future of railways, and give our minds to putting the R&D results into practical application in 5 to 10 years. Table 1 lists the R&D themes to tackle for railways in the future. As an example, the "Development of high-speed, large-capacity information and telecommunication technologies for railways" shown in the table, features common specifications of the telecommunication infrastructure that will be established in order to offer an advanced network service to passengers on trains running at high speeds. In the "Development of fuel cell vehicles", which is positioned as one of the most important themes relating to the environment and energy issues, we shall conduct running tests with railway vehicles on which fuel cells are mounted.

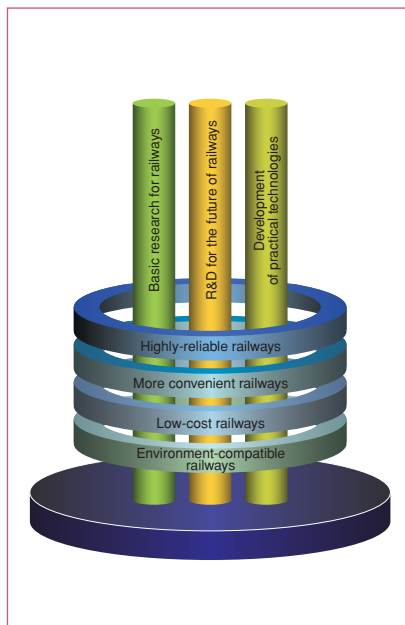


Figure 1. R&D activities of RTRI.

In line with the theme "Application of linear motor car technologies to the conventional railway system", we shall carry out R&D into applying advanced technologies that have been developed for MAGLEV, such as the superconductivity and linear motor, to the conventional railway system. Specifically, we shall tackle, for instance, the development of superconducting magnetic bearings and a rail brake system which employs linear induction motors.

(2) Development of practical technologies

In response to specific requirements from JR Companies, we shall promote R&D that will help them to solve problems in the field. In addition, we shall set our voluntary themes to focus on the technological fields where the development shall be given top priority. Furthermore, we shall continue with contract-based research and development.

(3) Basic research for railways

We shall carry out "analytical research" into the elucidation of railway-specific phenomena such as dynamics and tribology, and simulations of non-steady state aerodynamic phenomena. In addition, we shall try "exploratory and introductory research" aiming at applying new technologies, materials and research techniques to railways, such as the possibility of applying nano-materials to railways, etc.

2. International Activities

By attending various international conferences, including meetings of the World Congress on Railway Research (WCRR), we shall strive to promote the exchange of information on railway technology. In addition, we shall engage in joint research with research organizations in Europe and Asia, and help establish international standards for railways.



Table 1. Themes of R&D for the future of railways

R&D Objective	Theme
Highly-reliable railways	[Improvement of train running safety] • Configuration of signaling systems with RAMS index and its application • Development of method to evaluate characteristics of vehicle dynamics with a hybrid simulator [Securing of stable transportation] • Evaluation of earthquake-resistance of existing railway facilities and implementation of seismic measures • Application of sensing technology and information technology to railway facilities management
More convenient railways	[Improvement of convenience] • Development of high-speed, large-capacity information and telecommunication technologies for railways • Improvement of efficiency of transportation planning based on dynamic demand forecast [Improvement of comfort] • Development of human simulation technologies to improve safety and comfort
Low-cost railways	[Reduction of maintenance cost] • Creation of models to simulate rail damage and ballast track deterioration and evaluation of techniques to reduce maintenance costs • Development of a new maintenance-free and low-noise track
Environment-compatible railways	[Noise-less railways] • Development of a tool to predict rolling noise and structure-borne noise and measures for noise reduction [New energies] • Development of fuel cell vehicles • Application of linear motor car (MAGLEV) technologies to the conventional railway system