

Reviewing RESEARCH 2005

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During the five years from 2005 to 2009 RTRI worked on a basic plan called RESEARCH 2005. As part of the plan, RTRI promoted research and development by setting priority objectives in several fields: “Research and Development for the Future of Railways”, “Development of Practical Technologies” and “Basic Research for Railways”. The intention of these targets was to achieve “Highly-reliable Railways”, “Railways which are More Convenient”, “Low-cost Railways” and “Environmentally-friendly Railways”. Most of the expected aims of the plan were achieved and the plan was finished successfully.

1. Research and development

(1) Research and development for the future of railways

The research and development programme concerning the future of railways corresponds to a number of tasks which are aimed at achieving technical breakthroughs, with a view to practical applications in the next 5 to 10 years or more. There were 13 tasks in total which were implemented as mini-projects. These tasks proceeded almost as planned. Most of the expected aims were achieved, and the tasks were finished. Examples of achievements from the various tasks are as follows:

In the task entitled “Development of a method of evaluating vehicle dynamic characteristics using a hybrid simulator,” RTRI developed a system for evaluating the performance of vehicle components by combining test equipment for vehicle components such as dampers and air springs with a real-time simulator which reproduced the running conditions on main lines. Moreover, RTRI made it possible to simulate the running tests with a trainset by adding an inter-car dynamics simulator to the rolling stock test stand (which is designed for a single car) and combined with the real-time simulator. Furthermore, RTRI developed a bogie that can reproduce arbitrary characteristics, and RTRI’s work also made it possible to ascertain the necessary performance characteristics before building a prototype of the bogie.

In the task entitled “Development of human simulation technologies to improve safety and riding comfort,” RTRI developed the education programme to improve drivers’ abilities to respond to difficulties, by making them aware of driving actions in abnormal situations, etc. Furthermore, RTRI developed a passenger flow evaluation technique and a simulation technique to assess the behaviour of passengers evacuated in emergency situations in station yards, etc. based on the results of measurements obtained using a station simulator and actual stations.

In the task entitled “Development of an analytical tool to predict rolling noise and structure-borne noise, and

measures for noise reduction,” RTRI clarified the mechanism whereby rolling noise and structure-borne noise (the main noise sources in railways) are generated, and established a method to predict the generation of noise. Furthermore, RTRI drew up suggestions for noise-reducing measures and demonstrated how effective these measures were in quantitative terms.



(2) Development of practical technologies

Regarding the development of practical technologies, RTRI carried out the tasks that contribute to the solutions of specific problems at field sites of the JR companies. It also carried out tasks in those specialist fields where RTRI has greater expertise than other organizations.

(3) Basic research for railways

Basic research for railways comprises research that generates practical railway technologies or serves as a foundation for them; this work is essential in solving a variety of railway-related problems. RTRI carried out research aimed at better understanding of railway-inherent phenomena, research into the application of new technologies and new materials to railways, and research into technologies for the maglev transportation system.

2. International activities

RTRI promoted collaborative research programmes between Japan and France and between Japan, China and Korea, and also started collaborative research between Japan and England. Further, RTRI participated in the organization of and arrangements for the World Congress on Railway Research (WCRR).

Regarding international standards for railways, RTRI participated in the establishment of international standards, as the domestic council organization responsible for electric railway technologies. Moreover, RTRI set up a task force to establish the Railway International Standards Center in July 2009, establishing the Preparatory Office for the Railway International Standards Center. The Center, which was established in April 2010, has the objective of obtaining a broad response to deliberations about international standards affecting railways.