Promoting Technological Development at the Komaki Research Center

JR Central opened its own R&D center in Komaki, Aichi Prefecture in July 2002, to further strengthen our efforts toward technological development that will support our future, to enhance our technical capabilities, and to foster technically skilled human resources. We are promoting R&D activities focusing on “Improving railway technology” and “Challenging in new fields” at the Komaki Research Center.

Under the slogan of “Improving railway technology” we strive to ensure safe and reliable transportation and enhance the transportation service of the Tokaido Shinkansen by performing demonstration tests using large-scale test devices, measuring/analyzing running test data, and performing theoretical analysis through simulations. These efforts are linked to the development of higher levels of safety and service, and reductions in costs, such as making maintenance more efficient.

Further, under the slogan of “Challenging in new fields”, we are engaged in the practical application of functional materials such as photo catalysts, and leading-edge research and development that will contribute to energy-saving maintenance and cost reduction.

Development of the Series N700

The Series N700 rolling stock began commercial operation in July 2007. The results of various research and development conducted at the Komaki Research Center are reflected in this new rolling stock. For example, in order to further improve riding comfort, the Series N700 introduced a newly developed “Body Inclining System” and “Advanced Semi-active Suspension System” that was developed by utilizing the “Vehicle Dynamic Simulator.” These developments allow the Series N700 to maintain riding comfort while traveling on curves at 270 km/h and also to reduce the level of vibrations transmitted to the interior of the cars. In order to improve the environment along tracks, we utilize “Low-noise Wind Tunnel Devices” and developed “Improved Rolling Stock Nose Shape”, “All-covering Hoods”, and a “New Pantograph Configuration”. Furthermore, we have employed photo catalytic device to reduce tobacco odor when installing smoking rooms to completely separate smoking and nonsmoking sections, which is a practical application of our proprietary technology as part of our “Challenging in new fields.”

Introduction of Rolling Stock Field Test Simulator

In order to enable independently implemented demonstrative tests, the “Rolling Stock Field Test Simulator” was introduced at the Komaki Research Center and actual tests were started in April 2008.

This simulator works by running a Shinkansen rolling stock atop track wheels that correspond to rails, and reproducing running conditions by imposing various vibrations that are generated during running. We are leveraging the simulator in our efforts aimed at the further pursuit of safety and stability, and the very best riding comfort, as well as our efforts to make rolling stock lighter and more energy efficient.
Advanced Maintenance of Structures

JR Central is continuously engaged in research and development aimed at advanced maintenance of structures. For example, in addition to performing field surveys and developing reinforcement methods of steel bridges, viaducts, and tunnels of the Tokaido Shinkansen, in FY2009 we introduced a new structure testing apparatus (Tri-axial Loading System for Structures) and are proceeding with research aimed at creating a standard to evaluate a degree of soundness of structures and a design code that suppresses costs while maintaining quality.

Enhancing Technical Capability by affiliating with Nippon Sharyo, Ltd.

JR Central signed a capital and business alliance agreement with Nippon Sharyo, Ltd. and made a tender offer for its common stock whereby Nippon Sharyo became a consolidated subsidiary in October 2008. We are leveraging this complementary relationship as we make efforts to improve our overall technical capability in regards to rolling stock development.

Overseas Deployment of High-Speed Railway System

The Tokaido Shinkansen maintains a flawless safety record of no accidents resulting in fatalities or injuries of passengers onboard for about 46 years of commercial train operation, and is a high-speed railway system unparalleled anywhere in the world in terms of safety and punctuality. Leveraging its comprehensive world-leading high-speed railway technology overseas, JR Central can diversify the source of its earnings, while allowing domestic manufacturers to maintain and strengthen their technology and skills and expand their international high-speed railway market. Furthermore, JR Central expects that the overseas deployment of its high-speed railway system will bring technological innovation and cost reduction of railway-related equipment and will ultimately help the performance of JR Central.

(1) Establishment of C&C Office

With its environmentally-friendly characteristics, railway, and in particular high-speed railway, is attracting more and more interest from all over the world. In light of this situation, in July 2009, JR Central established the “C&C (Consulting and Coordination) Office-Overseas High Speed Railways Project” section to handle high-speed railway projects abroad. This new section proposes the deployment of high-speed railway as a total system that includes civil engineering structures, track, electrical equipment, signaling equipment, rolling stock, operation management systems, maintenance and repair, etc. to overseas high-speed railway markets. As overseas high-speed railway projects are fleshed out, this section will coordinate with related Japanese companies to provide support and consultation necessary for the safe and reliable operation of a high-speed railway, such as the provision of operation and maintenance manuals as well as training for personnel.

(2) The N700-I Bullet and SCMAGLEV

JR Central is proposing high-speed railway systems called the “N700-I Bullet” and “SCMAGLEV” to overseas markets. The “N700-I Bullet” is a total system that consists of not only the “N700-I” rolling stock but also track, electrical equipment, signaling equipment, rolling stock, operation management systems, maintenance and repair, etc. to overseas high-speed railway markets. As overseas high-speed railway projects are fleshed out, this section will coordinate with related Japanese companies to provide support and consultation necessary for the safe and reliable operation of a high-speed railway, such as the provision of operation and maintenance manuals as well as training for personnel.

(3) Efforts for Overseas Deployment of the N700-I Bullet and SCMAGLEV

JR Central has made efforts to raise awareness of the superiority of the “N700-I Bullet” and “SCMAGLEV”. In November 2009, JR Central held a “High-Speed Rail Symposium” to introduce its high-speed railway systems to many guests that attended from various countries, including the US. During the symposium JR Central conducted a demonstration run of Series N700 rolling stock at the maximum speed of 330km/h (205mph). The Superconducting Magnetic Levitation Railway (SCMAGLEV) is a high-speed railway system developed by JR Central that can operate at a speed of 500km/h (310mph).