



Creating "Social Value" –Social–  
Promotion of Technological Development

▶ Technological development to support JR Central's growth

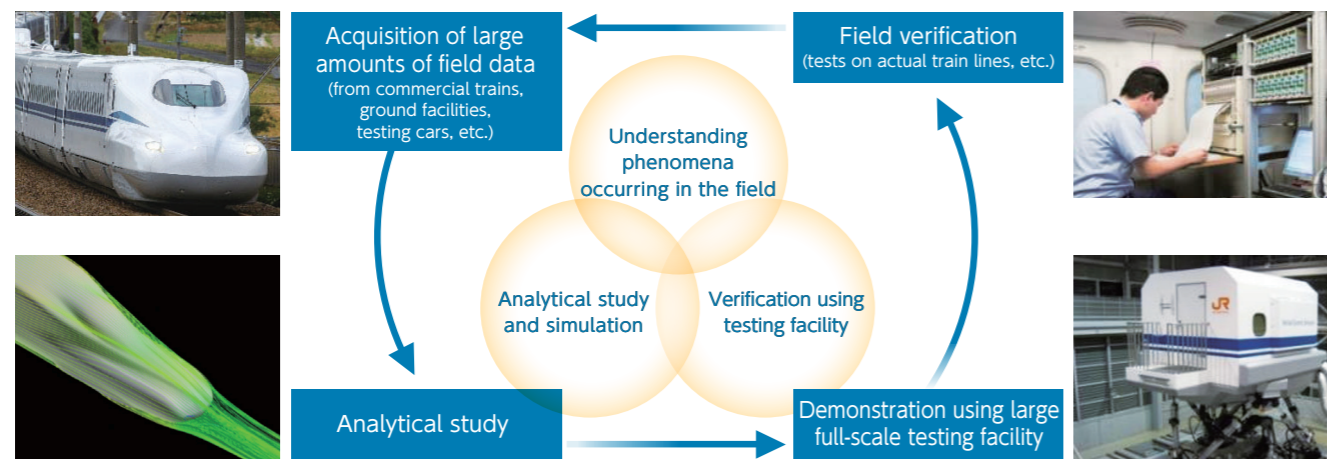
In order for JR Central to fulfill its mission and develop in the future, it is essential to work continually to ensure safe and stable daily transportation and pursue comfortable transportation services, as well as to build hardware and systems that will serve as the foundation to support such transportation and services through technological development. To address various technological issues in a more integrated and comprehensive manner, we have been systematically promoting technological development that

will lead to ensuring safe and reliable transportation in our railway business at the Komaki Research Center, which was established in 2002, by setting issues that contribute to company policies from a medium- to long-term perspective.



Komaki Research Center

Basic cycle of railway R&D

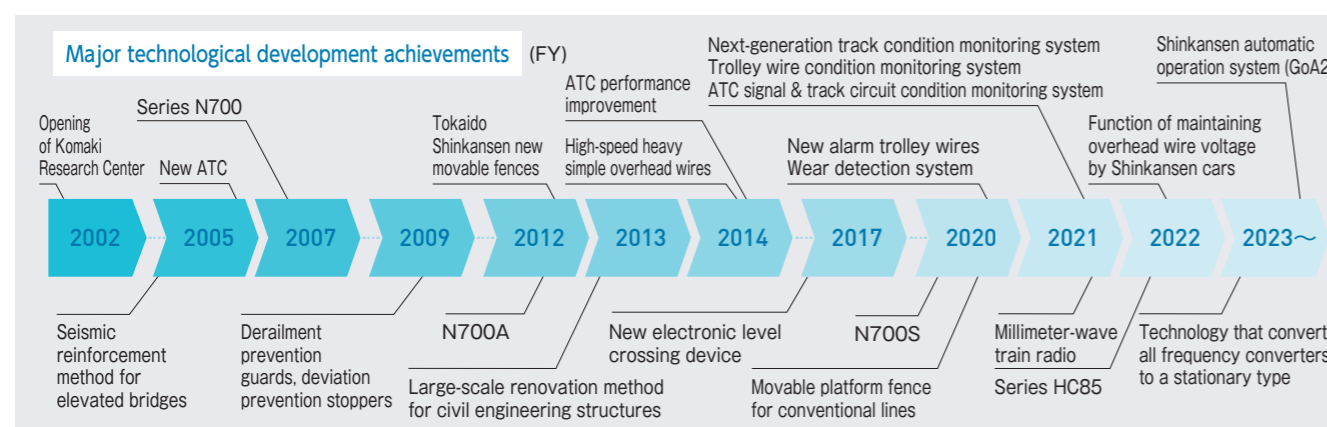


▶ Key themes of technological development

Based on the themes of "improving safety," "promoting reform of business operations," "realizing next-generation railway systems," and "applying technology to the Chuo Shinkansen," we are promoting technological development to provide safer, more convenient, and more comfortable services efficiently by actively incorporating

technologies such as sensing, image recognition, and robotics. We also promote further innovation of railway systems and initiatives to expand our technological scope by broadening our horizons to include a wider range of technical fields to sustain and develop the company into the future.

▶ Major technological development achievements



▶ Technological development, technological capability enhancement, and human resources development for the future

In addition to improving railway technology for the Shinkansen and conventional lines, JR Central is striving to develop technologies that will support the company's future, as well as to improve our technological capabilities and develop human resources. At the Komaki Research Center, we have utilized its characteristic full-scale testing facilities to achieve various technological developments, including new rolling stock, measures to prevent derailment and deviation of the Shinkansen, large-scale renovation methods for civil engineering structures, and high-speed heavy simple overhead wires for the Shinkansen. We are also working on numerous technological developments in light of the rapid advances in information and communications technology (ICT) and the progress of digital transformation in recent years.

Since the opening of the Komaki Research Center, we have been striving to enhance the technological capabilities of the entire company through close cooperation between the Railway Operations Divisions, which manage daily train operations, and the Technology Research and Development Department to address the technological challenges faced by the Railway Operations Divisions and conduct regular technology exchanges, and through sharing personnel between the two departments. Going forward, we will pay close attention to technological trends in other industries and fields, broaden our inspiration and application, and actively incorporate external knowledge to enhance our organizational capabilities so that we can meet the difficult technological challenges we face in the railway business.

▶ Major technological developments: Sophistication and labor saving in maintenance, cost reduction in maintenance and renewal of facilities

We are developing technologies to advance operations, reduce labor, and cut costs, such as mechanizing and systemizing maintenance operations by using new

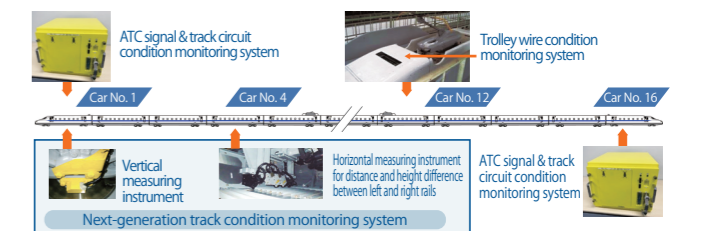
technologies such as sensing, image recognition, information communication, mass data analysis, and robotics, under the basic premise of ensuring safety.

(Example of technological development 1) Development of technology to measure ground equipment using N700S commercial trains

For the Tokaido Shinkansen, tracks and electrical equipment are measured by Dr. Yellow, a train dedicated to measurement. We have also developed a technology to reduce the size and weight of measuring instruments that can be installed in commercial trains of the latest N700S rolling stock, enabling us to understand the condition of facilities more frequently and carry out maintenance work in a timely manner.

track circuit condition monitoring system. By measuring the condition (wear, height, etc.) of trolley wires using commercial trains, we can eliminate the need to periodically measure all the lines, which workers used to do once a month at night, saving a significant amount of labor. We will also be able to check the integrity of ATC signals and track circuits at a high frequency to quickly detect signs of abnormality and take the necessary action and perform maintenance on signaling equipment and track circuits promptly.

As for track condition measurement, we have developed a next-generation track condition monitoring system with improved accuracy using our proprietary calculation program. By measuring the track conditions while trains are moving and sending the data in real time to the General Control Center and others, we will be able to monitor track conditions more frequently and more accurately.



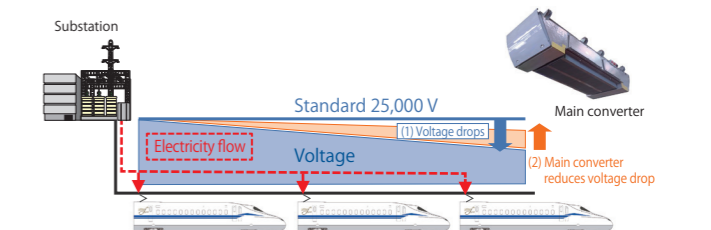
Measurement of ground equipment using N700S commercial train

(Example of technological development 2) Development of function to maintain overhead wire voltage by Shinkansen cars

For the Tokaido Shinkansen, we have maintained the overhead wire voltage by improving the electric ground equipment to prevent failure to maintain the necessary voltage for stable train operation due to a drop in overhead wire voltage caused by high-density train operation. As a technology to replace the maintenance of overhead wire voltage with this ground equipment, we have developed a function that can maintain overhead wire voltage by implementing a function to reduce voltage drops on overhead wire voltage in rolling stock through software improvements to the main converter installed in N700S cars. This is the world's first technology to maintain overhead wire voltage with rolling stock.

is implemented on all Tokaido Shinkansen trains, we expect to be able to reduce the number of substations by about 10% and the number of power compensators by about half. The introduction of this system is expected to reduce our electricity consumption by approximately 20 million kWh per year.

This technological development enables us to remove some of the substations and power compensators. When this function



Development of a function to maintain overhead wire voltage with Shinkansen cars