

The 9th SNCF-RTRI Collaborative Research Seminar held

The Railway Technical Research Institute (RTRI) and SNCF held their 9th Collaborative Research Seminar on December 3, 2020.

RTRI and SNCF concluded an agreement on collaborative research and related activities in 1995. Since then, both parties have been collaborating in many fields of railway technical research. They jointly organize a research seminar every two years. There, they discuss their management policies regarding collaborative research, deliver presentations of the results of each research project and set the plan and schedule of projects for the next phase.

This 9th Seminar was attended by 40 people, including Mr. Pierre Izard, Vice President, and Ms. Carole Desnost, Director of Innovation and Research from SNCF, RTRI's President Watanabe and Executive Director Furukawa and researchers of each project. The participants from SNCF had planned to visit Japan and attend the seminar, but due to the Covid-19 travel restrictions, the seminar was held online.

(1) Management Meeting

The Management Meeting was attended by Vice President Izard, President Watanabe and other executives. The RTRI participants explained the outline of the master plan started in 2020 "RESEARCH 2025" and their initiative to introduce AI and other digital technologies to railway operation. The SNCF participants explained the outline of their research project "TECH4RAIL"*¹ and "SNCF initiative to realize carbon-free railways in 15 years" as one of their energy-saving efforts. Both parties agreed to continue sharing information on the topics to use AI and other cutting-edge technologies.

*¹ TECH4RAIL is a research and development plan that SNCF has been implementing since 2016, and Zero Emission is set as one of its goals.



Management Meeting (Upper center: President Watanabe)

(2) Presentation Meeting

Presentations were delivered on two collaborative research projects and eight information exchange projects of the 9th Phase from 2018 to 2020 and on two collaborative research projects and eight information exchange projects of the 10th Phase from 2020 to 2022, followed by lively discussions (Table 1).

In particular, the presentation on the topic “Passenger-driven operation” was followed by active discussions on the amount and accuracy of machine learning data used to predict delays in train operation, reflecting great interest of the participants in applying the state-of-the-art technologies to railways.

The next collaborative research seminar will be held in the fall of 2022 in Japan.

Table 1 9th Phase and 10th Phase Collaborative Research / Information Exchange Projects

Type	9 th Phase (2018-2020)	10 th Phase (2020-2022)
Priority topics	<ul style="list-style-type: none"> ● Detection of obstacles in the track from the cabin or track side (autonomous train operation) ● Energy storage systems and high-voltage converters (Energy saving) 	<ul style="list-style-type: none"> ● Information exchange on AI applications to railways ● Information exchange to analyze cases of scouring disasters (disaster prevention) ● Further utilization of energy storage systems and high-voltage converters, for higher environmental and cost performance (energy saving) ● Human science for safety
Collaborative Research	<ul style="list-style-type: none"> ● Improvement of the analysis of crack growth in rails ● Study on the inspection and predictive maintenance for power supply system 	<ul style="list-style-type: none"> ● Study on the inspection and predictive maintenance for power supply systems ● Study on aerodynamic noise of rolling stock bogies by numerical simulation and wind tunnel tests
Information Exchange	<ul style="list-style-type: none"> ● Evaluation of aerodynamic noise of rolling stocks by numerical simulation and wind tunnel tests ● Wear characteristics of bainite rails^{※2} ● Train-track interaction for running safety ● SIL4^{※3} high positioning train technology ● Applicability evaluation of superconducting feeder cables for high-speed railway systems ● Passenger-driven operations 	<ul style="list-style-type: none"> ● Examination of current property on superconducting feeder systems for high-speed railways ● Optimized train operations to improve passenger's service and punctuality ● Information exchange on recovery mechanism of ballast lateral resistance by stabilizers^{※4} ● Information exchange on 3D printing application to manufacturing parts

※2 Rail with bainite structure developed to suppress shelling, which is rail damage due to contact with wheels

※3 Safety Integrity Level, defined in IEC61508. SIL4 is the highest level of safety (lowest probability of fatalities due to equipment failure).

※4 Track maintenance machine that promotes the stability of the track by applying vibration to the track on the rail after work such as track bed replacement.



Presentation Meeting (RTRI)