



Newsletter on the
Latest Technologies
Developed by RTRI

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Railway Technology Avalanche

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Developing New Technologies for Solving Various Railway Issues

Norimichi KUMAGAI
Executive Director

I consider it meaningful to review at this moment the major issues Japan's railway business is now faced with and the development of new technologies that are needed to solve them. Those issues concern the ongoing demographic change, global environment and railway safety. Specifically, the demographic change means the declining birthrate and the aging society, which translates into fewer railway users. If the present trend continues, it should become increasingly difficult for the railway business to secure sufficient employees and maintain the level of railway technology. Concerning the global environment, reducing CO₂ emissions is a major challenge. As for railway safety, it is important to provide against big earthquakes which are anticipated in the near future in certain urban areas and areas along the Shinkansen lines and to prevent train accidents. (For example, in a recent case, a train running at abnormally high speeds derailed and overturned, taking a heavy toll.)

Railway operators are striving to enhance the efficiency of operations, introduce energy-efficient vehicles, improve signaling systems and develop new monitoring systems for preventive maintenance.

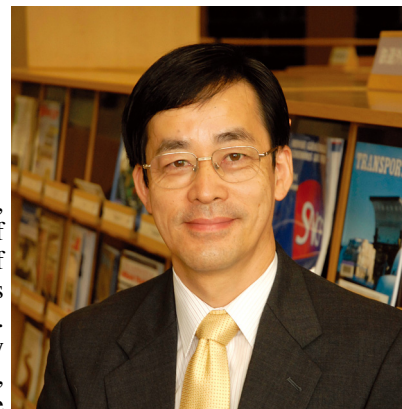
In order to solve the issues mentioned above, it is necessary to develop new low-cost, high-performance technologies based on entirely new concepts, aside from existing technologies. To carry out R&D on safety problems to prevent recurrence of railway accidents, RTRI has revised its R&D program. For example, RTRI has tackled development of a low-cost speed-check ATS system, a new train control method utilizing general-purpose radio and a new method for assessing railway risks. In addition, as measures to save energy, we are developing a new synchronous motor for vehicle that helps reduce the AC loss, a new transformer for the Shinkansen system utilizing superconducting coils and basic technology for fuel cell-driven cars. Research on reduction of the weight and running resistance of vehicles contributes to savings of energy.

In addition, the problem of maintenance of railway facilities cannot be neglected. Many of the railway tunnels, bridges, etc. have become

noticeably superannuated. There are cases where the superannuation is accelerated as a result of an unexpectedly rapid increase in traffic volume. In order to renew superannuated facilities or carry out works to prolong their life in a planned manner in the future, it is necessary to come up with economical diagnostic methods and work methods.

From the standpoint of activating railways, positive R&D is also called for. I consider it the railway people's duty to increase the use of railways as an excellent means of mass transportation, decrease the use of automobiles and airplanes, expand the share of railways and thereby contribute to the improvement of the global environment. The experimental TGV marked the speed record of 574.8 km/h in April 2007. In that respect, I pay my respect to the French railway engineers. The achievement is very significant not only to French railways but also to railways of the whole world. The fact that the distributed drive system used on Shinkansen was adopted on the experimental TGV also impresses us.

It is not too much to say that the future of railways rests on R&D having clearly defined goals. Therefore, RTRI continues attaching importance to the international cooperation with railway operators, university researchers and makers of the world.



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