Newsletter on the Latest Technologies Developed by RTRI

Railway Technology Avalanche

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Railway Technical Research Institute
2-8-38 Hikari-cho, Kokubunji-shi
Tokyo 185-8540, JAPAN
URL:http://www.rtri.or.jp

Editorial Office: Ken-yusha, Inc.
URL: http://www.kenf.jp/en/

Viewpoints on the New Railway Age - Promotion of Basic Research -

Railways are now entering a new age, powered by a paradigm shift that also affects other industries to address a) the needs of adaptation to the global environment and efficient energy utilization, b) problems arising from the low birth rates and arrival of the aging society in recent years, c) crises of the management of autonomous bodies and d) the movement to review national land utilization plans; all of this amid the unstable economy of the country affected by globalization. On the other hand, realization of the maglev system that is just around the corner, high-speed train operation over a maximum speed of 400km/h, a cabinet decision to enact the Fundamental Law on Traffic, establishment of a new overseas railway consulting company and the rapid advent of low cost carriers (LCCs), provide opportunities and challenges in the new railway age.

Under the circumstances, railways are now required to push forward improved quality initiatives, including development of a derailment-free rail transport system, increase of the robustness against external forces created by natural phenomena, solutions for energy and the environmental issues, repair/replacement of aged structures and so on. To further improve the quality of the wheel-rail transport system for Japan which has already attained very high levels in technologies, basic research shall be promoted both on hardware and software technologies simultaneously. In regard to the natural phenomena surrounding railways, demanding tasks include developing countermeasures against the disasters caused by large-scale earthquakes and wind gusts. Research shall be promoted to investigate those characteristics; strong motion due to active faults and the occurrence mechanism of wind gusts. Based on these fundamental research programs, the accuracy of the early earthquake warning system and forecast of gusts will be improved. In the structural engineering field, investigation of the phenomenon of deterioration and innovative repair/reinforcement countermeasures for aged structures are required. It may be necessary to consider and adopt new indices and review fracture criteria to effectively investigate the effects of these phenomena. In addition, the deterioration of the materials used for rolling stock and infrastructure, performance of current collecting systems, effect of external forces on rolling stock behavior and the interactions between structures and vehicles, are important themes to achieve train operations over 400km/h. To properly assess the behavior of high speed trains, it is necessary to construct a high-performance test track simulator that will complement the tests on actual and test tracks. The results obtained from the research will be reflected in the maintenance standards of rolling stock and infrastructures.

RTRI continues the effort to accelerate the basic research realizing a further upgraded railway system to enhance the value of railways.

Hisashi TARUMI
President

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