

Korea Railroad Research Institute

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Profile

In 1996, the Korea Railroad Research Institute (KRRRI) was established by the Special Act on National Railroad Operation with funding from the Korean National Railroad (KNR). Based on the 1999 Amendment to the Act on Establishment, Management and Promotion of Government-funded Research Institutions, KRRRI became a member institute of the Korea Research Council of Public Science & Technology (KORP) under the Office of the Prime Minister.

Since its establishment, KRRRI has continued to play the most important role in developing railway technology and transferring its achievements to rail-related industries for public benefit. As a government-funded research institute, KRRRI also advises and assists the government on railway policy.

KRRRI's core functions are to:

- Carry out future-oriented R&D activities on high-speed railway, urban and light rail transit;
- Study railway policy and technologies on reconnection of Trans-Korean Railways (TKR) and links with international railway networks;
- Undertake performance and quality testing, assessment, and certification of railway systems and parts;
- Study safety and standardization of railway systems and parts;
- Promote development of expert researchers in railway technology

Organization

The KRRRI organizational structure is divided into project divisions and research divisions to provide greater operational efficiency for large-scale R&D projects and basic research, such as the newly established Transportation Key Technology Research Corps., and

the Trans-Korean Railways Research Corps. In addition, the National Research Laboratory (NRL) Team was assigned by the Ministry of Science & Technology to perform R&D on technology for evaluating the remaining life of rolling stock.

KRRRI Vision 2010 Medium- and Long-term Development Plan

In 2002, KRRRI announced a comprehensive development plan called *KRRRI Vision 2010* for the 8-year period to 2010. The aim of the plan, which is based on open management and globalized technology development, is to become a world-class railway research institute at the forefront of railway technology. Based upon this plan, R&D at KRRRI will endeavour to develop advanced railway technologies in order to make Korean railways safer, faster and more comfortable.

R&D Activities

The overall R&D activities of KRRRI can be divided into two categories—basic research projects and strategic national R&D projects. The basic research projects are selected in accordance with the aims of *KRRRI Vision 2010*. KRRRI's research projects to meet the challenges arising from rapid changes in railway technologies are funded by the government. On the other hand, strategic national R&D projects are assigned by government bodies such as the Ministry of Construction and Transportation (MOCT) and KNR as contracted research between KRRRI and the relevant authority.

Basic research projects

To develop advanced railway technologies, KRRRI focuses on the fields of Smart-Rail, railway information and the environment. In addition, we are

researching virtual engineering technologies, enhancement of railway systems, and railway management technologies. Our efforts are very much focused on preventing accidents and improving safety. We also conduct performance testing and safety accreditation.

Strategic national R&D projects

Korean High Speed Train (KHST)

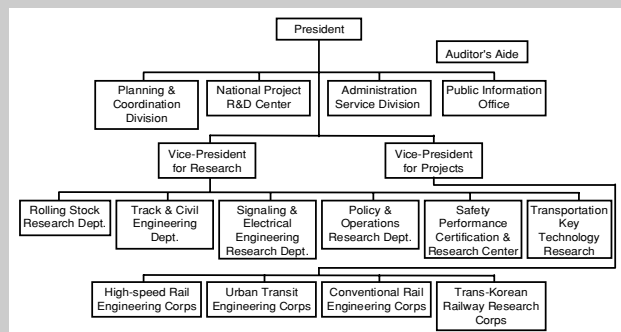
This large-scale project to develop a high-speed train with a maximum operating speed of 350 km/h was started in 1996 based on joint R&D between KRRRI, the government, industry, academia and other research institutes. A prototype KHST has been manufactured and it is being tested on test track. The main systems and electrical equipment were designed and completed using both homegrown and transferred technologies. The KHST has a number of unusual features, such as a high maximum operating speed of 350 km/h, an aluminium carriage body, eddy-current braking, articulated bogeys, unique nose shape, pressurized cars, etc. Trials have been conducted to evaluate running performance, ride comfort, brake performance, current collection performance, noise and vibration levels, etc., with good results so far.

After completion of trials, the safety and reliability will be verified by a second round of tests. In addition, the local development of 92% of the core technologies used in the KHST has provided a good chance to raise the level of domestic railway technology and industrial competitiveness. Strengthening domestic technology for the KHST, will help improve the technical level of related industries, helping to replace a large volume of imported products and establishing Korea as a player in overseas markets for railway infrastructure.

Standardization of urban rail systems

This project aims to enhance safety and

Organization of KRRI



Korean High Speed Train (KHST)

(KRRI)

efficiency by standardizing urban rail rolling stock and infrastructure while also reducing the construction and operation costs of urban rail transit. The aim is to achieve a level of 95% domestically manufactured parts for a standard EMU, saving some US\$216 million over a 5-year period. Furthermore, construction and operations cost should be cut by up to 30% by establishing standardized systems, improving information systems for infrastructure construction and management, and increasing transportation capacity on current subway lines.

Light Rail Transit

The objective of R&D on Light Rail Transit (LRT) systems is to develop a standard LRT system that is economic and safe and leads to sharp reductions in construction costs. KRRI has prototyped a standard rubber-tyred LRT vehicle and verified the major components such as lightweight aluminium body, single-axle bogie with two rubber tyres, etc. As a result, a test track for this LRT is nearing completion in Mokpo City to help relieve urban traffic congestion while improving safety and convenience.

Speeding up conventional railways

KRRI is also working on projects to increase the speed of conventional trains to 180 km/h through use of tilting technologies, improved track, and safe signalling systems.

Tilting trains are an established feature of railway operations worldwide, providing higher speeds through curves for shorter

journey times and enhancing competitiveness on routes where insufficient traffic or a lack of funds precludes construction of new high-speed tracks. Our aims are to keep costs low by developing maintenance-free tilting systems.

Trans-Korean Railways (TKR)

The newly established Trans-Korean Railway Research Corps. is working to develop an integrated railway system and to reconnect TKR with international railway networks. This project is expected to play a big role in unifying the divided Korean Peninsula while creating a new model for economic cooperation in north-east Asian.

There are still many obstacles to overcome before railways in the north and south are fully connected, but nobody doubts that full railway links will bring many economic benefits to the 'Two Koreas.' For example, railway links between Korea, Japan, China and Europe would bring \$248.5 million in transportation fees to the Korean Peninsula by around 2005. The biggest advantage in resuming the railway services is that it could serve as a turning point for South and North Korea

to emerge as a single economic community. More active economic partnership with Eurasia would also contribute to improving the economic importance of the Korean Peninsula in international trade.

Since 1999, the KRRI has been constructing its Railway Safety Research Facilities and the first construction phase will be completed this year. Eight large-scale facilities are scheduled to be built, including rolling test beds for bogies and full-scale power supply infrastructure. Completion of the second phase, including test facilities for signalling and track and civil engineering works is planned for 2008.

Conclusion

KRRI is working hard to become a world-class railway research institute based on its research results and technological know-how. In addition, the Institute is endeavouring to strengthen cooperation with other advanced railway organizations to further develop global railway networks in a rapidly changing railway environment. ■



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Dr Oh is the Director General of the Public Information Office of KRRI. After gaining a PhD from Virginia Polytechnic Institute and State University, he has held posts in the Rolling Stock Research Dept., and the Project Planning and Coordination Dept.