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Railway Technology Avalanche

Newsletter on the Latest Technologies Developed by RTRI No. 4

Railway Technical Research Institute
2-8-38 Hikari-cho, Kokubunji-shi
Tokyo 185-8540, JAPAN

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Pay Attention to the Papers from RTRI at WCRR2003!

Muramoto, Katsumi
Assistant Manager, International Affairs, Information & International Affairs Division

So that you can briefly be informed about the most attractive event in the field of railway technology this year, allow me to give you my suggestion. I am a worker attached to Railway Technical Research Institute (RTRI) currently in charge of the project on WCRR2003 (World Congress on Railway Research 2003), which is to be held in Edinburgh, Scotland, UK September 28 through October 1, 2003 as you may know. For the meeting, 22 papers submitted by RTRI were accepted including 10 oral and 12 poster presentations. I am confident that all the papers prepared by authors of RTRI will definitely provide you with useful information containing widely-ranged themes on railway technologies. We, therefore, hope you will find time and pay kind attention to our papers to be presented during the meeting. Moreover, I am anticipating seeing you at the Japan Railways (JR) exhibition booth to be set up in the venue for the meeting all the time so as to give you current information on JR. If you need any further assistance in getting yourself advised on JR, please

let me know through e-mail at www-admin@rtri.or.jp or feel free to directly call on me at the booth. I am really looking forward to being with you over there in Edinburgh!

Muramoto, Katsumi, Mr.

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The editor will absolutely welcome all your inquiries on the article(s) published in *"Railway Technology Avalanche."* Moreover, your information on where you certainly receive *"Railway Technology Avalanche"* including your name, title, as well as e-mail and regular-mail addresses will be helpful to the editor in successfully managing the handling for *"Railway Technology Avalanche"* to be with you without fail.

Editor: Sakai, Hiroyuki, PhD,
Deputy Manager, International Affairs
Phone, +81-42-573-7258; Fax, +81-42-573-7356;
E-mail, www-admin@rtri.or.jp

Development of Gauge-Changeable EMUs

Ishige, Makoto
Assistant Senior Researcher, Running Gear, Vehicle Structure Technology Division

Gauge-changeable EMUs (Electrical Motive Units. Fig. 1), which have been developed for through-operation between Shinkansen (1,435-mm gauge) and narrow-gauge (1,067-mm gauge) lines, are equipped with gauge-changeable trucks that feature the following.

(1) Capability to change the gauge while running
(2) Installation of traction motors
(3) Stability of high-speed operation
(4) Excellent performance for negotiating sharp-curves

There are two types of gauge-changeable trucks (type A and type B), both having a common gauge-changing unit (Fig. 2). The three-car test train is equipped with those two types of gauge-changeable trucks.

Each wheel of the truck type A (Fig. 3) rotates independently of other wheels. The truck is mounted with traction motors that are solid with wheels. The wheel unit of the outer-ring rotating type can slide along the non-rotating axle in the lateral direction. To fix the selected gauge, a dowel on the wheel unit engages with a hole on the axle box to be set in position and is locked by the carbody weight. During gauge changing operation, the carbody is suspended at the lower part of the axle box; the wheel unit drops due to its own weight in the axle box to unlock the dowel from the engagement hole; and wheels are guided along the guide rails on the ground to the other gauge section (Fig. 4). Since the truck type A does not have the self-steering function, it is based on a bogie-angle-linked steering mechanism.

The truck type B has an axle-wheel solid structure and uses the parallel Cardan driving system. The wheel units on the left and right sides can slide along the axle in the lateral direction and rotate together with the axle with which the wheel units are coupled with splines. To fix the selected gauge, a slide stopper engages in position with the groove cut on the axle box and axle arm, and is locked by the carbody weight. During gauge-changing operation, the carbody is suspended at the lower part of the axle arm; the slide stopper is lifted by an arm on the ground; and wheels are guided along the guide rails on the ground to the other gauge section (Fig. 6).

The gauge-changeable EMUs, which were subjected to gauge-changing tests and a high-speed endurance test for about 600,000 km on the standard gauge line at the Transportation Technology Center (Pueblo, Colorado, US), are now tested on a narrow-gauge line in Japan to check the performance for negotiating sharp-curves.

The gauge-changeable EMUs have been developed under a contract with the Japan Railway Construction Corporation.

Figure 1. Gauge-changeable EMUs.

Figure 2. Gauge-changing device.

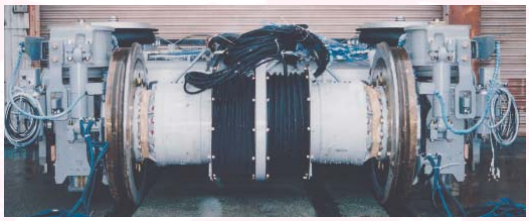

Figure 3. Gauge-changeable truck (type A).

Figure 5. Gauge-changeable truck (type B).

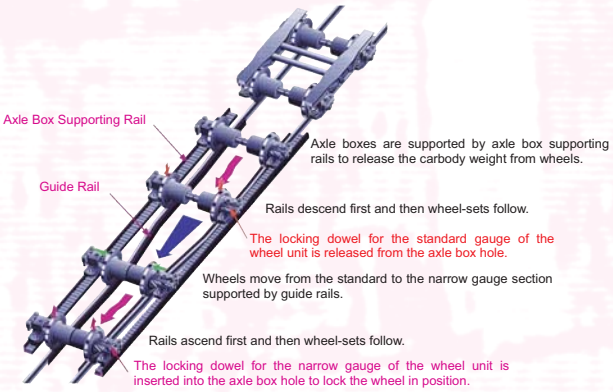

Figure 4. Gauge-changing operation (truck type A).

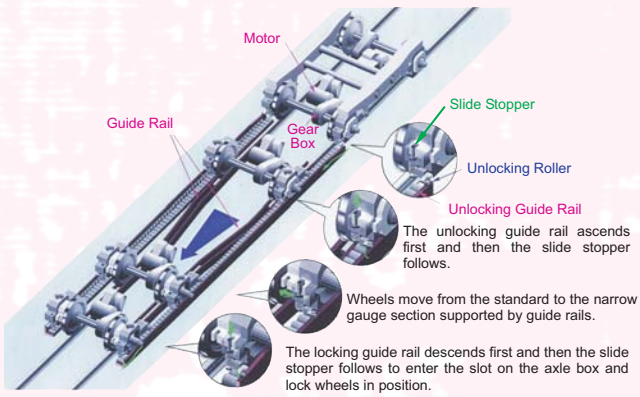

Figure 6. Gauge-changing operation (truck type B).