

## Technical Discussion of LRT without Contact Wires

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### 1. Introduction

LRT that is free of contact wires (referred to below as *contact-wire/battery hybrid LRT*) enables further savings in energy and maintenance for LRT systems while improving city landscapes. Since the Railway Technical Research Institute (RTRI) succeeded in trial operation of a battery-driven tram in August 2003 at the test track on its premises, it has promoted research and development of a number of related technologies. These include the signal system required for the commercialization of LRT that is free of contact wires and a guidance system from the viewpoint of universal design.

### 2. Workshops for technical discussion of LRT

To comprehensively introduce the results obtained so far from research and development of element technologies to existing tramway business promoters and autonomous bodies who are discussing the introduction of LRT, the RTRI decided to sponsor and manage workshops for technical discussion of LRT for the three-year period from fiscal 2005 to 2007.

The RTRI acted as secretariat for the workshop committee led by the University of Tokyo's Professor Yoshihiro Suda and composed of members from universities, the Ministry of Land, Infrastructure, Transport and Tourism, the National Police Agency, ten tramway business promoters and nine autonomous bodies.

The themes on the agenda were as follows:

1. LRV without contact wires
2. Simplified signal systems
3. Operation control and guidance systems
4. A compound traffic system

The committee also performed feasibility studies on the construction of new lines, the operation of battery-driven trams on parts of electrified sections, and the extension

of such an operation mode to clarify cases where LRT without contact wires would be advantageous from the viewpoint of economy.

### 3. The contact-wire-free Hi-tram LRV

Under contract with the New Energy and Industrial Technology Development Organization (NEDO), the RTRI placed an order with a

car builder for the manufacture of a hybrid test tram-train known as the Hi-tram. The vehicle is driven with power supplied from on-board batteries and/or through contact wires from external power sources.

The tram was completed last autumn and was subjected to various tests, including a quick-charge test from rigid contact wires on the premises of the RTRI. From November 2007 to March 2008, the tram was subjected to running tests to check the effects of energy saving and durability at extremely low temperatures in Sapporo (on the northernmost commercial streetcar line in Japan) in cooperation with Sapporo City's Transport Bureau.

### 4. Conclusion

The RTRI has promoted technical discussion for three years, not only on the new LRV tram but also on a new LRT system as a whole. The institute will strive to enhance the LRT system to create an innovative and efficient transport network through technical development, thereby aiming at the commercialization of LRT without contact wires - a technology developed in Japan.



Fig. 1 Reporting session (panel discussion) at the workshop for technical discussion held last autumn



Fig. 2 The Hi-tram under a running test in snowy conditions in Sapporo