

# valuation of Road-Embedded Dynamic Power Transfer System for Outdoor Use Logistic Vehicle

Osamu Shimizu<sup>1)</sup> Kazuyoshi Hanabusa<sup>1)</sup> Kota Arasaki<sup>1)</sup> Daisuke Gunji<sup>4)</sup>

Yuto Sakai<sup>5)</sup> Hiromori Ikeda<sup>6)</sup> Fuminori Matuoka<sup>7)</sup>

1) Graduate School of Frontier Science, The University of Tokyo,

5-1-5 Kashiwanoha, Kashiwa, Chiba, 277-8561 (E-mail: shimizu.osamu@edu.k.u-tokyo.ac.jp)

2) Advanced Products Development Center, Technology & Intellectual Property HQ, TDK Corporation,

2-15-7, Higashi-Ohwada, Ichikawa city, Chiba 272-8558

3) R&D Division, TDK-Lambda Corporation,

2-15-7, Higashi-Ohwada, Ichikawa city, Chiba 272-8558

4) New Product Development Department, NSK Ltd.,

1-5-50 Kugenuma Shimmei, Fujisawa city, Kanagawa 251-8501

5) BR NEXT GENERATION LOGISTICS DIV., SHINMEI INDUSTRY CO., Ltd

3-20, Koromogahara, Toyota city, Aichi, 471-0856

6) Central Japan Business Dept., TOYOTA T&S CONSTRUCTION CO., LTD.,

65, Kamekubi-cho Kamimukaida, Toyota city, Aichi, 470-0375

7) Strategy Planning & Administration Dept., TOYOTA MOTOR CORPORATION,

1, Motomachi, Toyotashi, Aichi, 471-0854

**KEY WORDS:** EV and HV systems, charge/discharge, wireless power transfer, road (A3)

Wireless power transfer has been proposed to solve the issue of the electric contact fault or maintenance in the direct charging system. In this research, dynamic wireless power transfer (DWPT) system is developed for outdoor auto guided vehicles. This DWPT system uses magnetic resonance coupling, therefore the system consists of an ACDC converter, an inverter, a transmitter coil, a receiver coil, and rectifier. The transmitter coil is designed and evaluated to have enough durability for loading by AGV. As the result 10-month aging test results showed that the power transmission coil did not change due to changes in the surrounding environment.

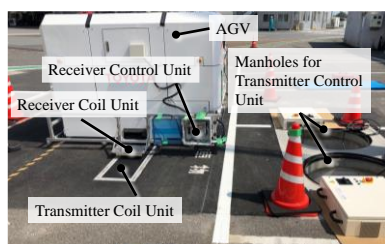


Fig.1 DWPT System with AGV

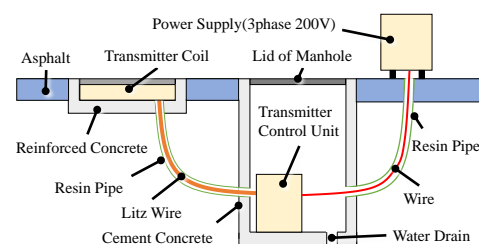


Fig.2 Connection of Transmitter

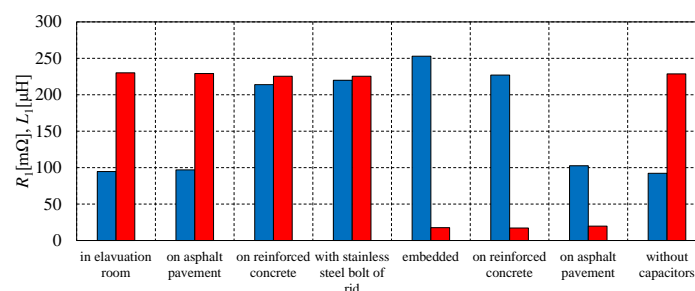


Fig.11 Parameter Change by Construction