

# **INTERNATIONAL CONFERENCE ON MAGLEV TRANSPORT '85**

Sponsored by: The Institute of Electrical Engineers of Japan  
Co-Sponsored by: The Japan Society of Mechanical Engineers  
The Japan Society of Civil Engineers  
Supported by: Ministry of Transportation

Keidanren Kaikan, Tokyo  
17-19 September 1985

The Institute of Electrical Engineers of Japan

## Organizing Committee

### Chairman:

**MATSUO, Tetsuo**

*Chitose Denki Kogyo, Co., Ltd.*

### Vice Chairman:

**IGUCHI, Masakazu**

*Univ. of Tokyo*

### Members:

**AKAI, Mutsuo**

*Toshiba Corporation*

**AMANO, Yoshio**

*The Institute of Electrical Engineers of Japan*

**ARAI, Seinosuke**

*Ikutoku Technical Univ.*

**IGARI, Takehisa**

*Chuo Univ.*

**IMAI, Koji**

*Toshiba Corporation*

**ISHIKAWA, Akira**

*Hitachi, Ltd.*

**KAWANISHI, Kenji**

*Nippon Univ.*

**KAWASHIMA, Maumi**

*Sumitomo Electric Ind., Ltd.*

**KITAMOTO, Mitsuo**

*Japan Air Lines Co., Ltd.*

**KYOTANI, Yoshihiro**

*Japanese National Railways*

**MAEKAWA, Norio**

*The Japan Electrical Consulting Co., Ltd.*

**MASADA, Eisuke**

*Univ. of Tokyo*

**MATSUMOTO, Yoshihiro**

*Toshiba Corporation*

**MURAKAMI, Kouichi**

*Tohoku Univ.*

**NABAE, Akira**

*Technological Univ. of Nagaoka*

**NISHIMURA, Fumikazu**

*Gijyutsu-Soken*

**NISHIO, Gentaro**

*Japan Railway Engineers' Association*

**SHIBUYA, Eiji**

*Mitsubishi Electric Corporation*

**SUZUKI, Shizuo**

*Japan Air Lines Co., Ltd.*

**YAMADA, Hidezo**

*Japan Railway Engineers' Association*

## Technical Program Committee

### Chairman:

**MASADA, Eisuke**

*Univ. of Tokyo*

### Members:

**HOSODA, Yoshikado**

*Sumitomo Electric Ind., Ltd.*

**KATO, Junro**

*Japan Air Lines Co., Ltd.*

**KITAGAWA, Kazuto**

*Japan Railway Engineers' Association*

**KUSHIMA, Yoshihiro**

*The Institute of Electrical Engineers of Japan*

**MATSUDA, Kazuo**

*Japan Railway Engineers' Association*

**MATSUDA, Shoji**

*Toshiba Corporation*

**MIYAIRI, Koumei**

*Hitachi, Ltd.*

**MIYAMOTO, Masayuki**

*Japanese National Railways*

**NAGAI, Masao**

*Tokyo Univ. of Agriculture & Technology*

**NAKAJIMA, Tsutomu**

*The Japan Society of Mechanical*

*Engineers*

**OGATA, Masaharu**

*Mitsubishi Electric Corporation*

**SAWADA, Kazuo**

*Japanese National Railways*

**TAMURA, Minoru**

*The Univ. of Tokyo*

# CONTENTS

Development of magnetic levitation transport systems in the Federal Republic of Germany survey, present state, prospects, and reasons <i>D. Rogg</i>	1
An overview of Canadian maglev research and development <i>N. E. Rudback, W. F. Hayes, A. A. Fife, A. R. Eastham, and M. Audette</i>	13
The development of maglev transport and related systems in Japan <i>E. Masada</i>	21
A 3-dimensional calculation method for a LIM having U-shaped secondary compared with measurements <i>P. K. Sattler</i>	29
On suitable analytical method for LIM propulsion <i>S. Nonaka and T. Furukawa</i>	37
On the design of single-sided linear induction motors for propulsion of maglev vehicles <i>S. Nonaka and T. Higuchi</i>	45
Analysis of linear induction drives by electromagnetic and finite element techniques <i>A. R. Eastham, G. E. Dawson, J. F. Gieras, R. Ong, and K. Ananthasivam</i>	53
Short-stator propulsion system of HSST-03 <i>E. Masada, K. Fujisaki, M. Kitamoto, H. Takeuchi, M. Kawashima, and Y. Hosoda</i>	61
The state-of-the-art technology of on-board inverters for traction <i>S. Sone</i>	69
Propulsion and power supply system of the Transrapid 06 vehicle design and test results part 1: propulsion <i>R. Friedrich, K. Dreimann, R. Leistikow, E. Böhm, and A. Weller</i>	75
Propulsion and power supply system of the Transrapid 06 vehicle design and test results part 2: power supply <i>K. Dreimann, R. Friedrich, R. Leistikow, G. Cieřow, H. Grünwald, and P. Wienenga</i>	83
LSM propulsion system of the Miyazaki maglev test track <i>K. Nakamura, S. Koike, T. Tatsumi, N. Maki, Y. Nakamichi, and S. Nishi</i>	91
Power supply system to drive maglev vehicles MLU 001 <i>H. Ikeda, S. Iwawaki, Y. Nakamichi, T. Outake, and T. Saijo</i>	99
The electromagnetic suspension system of the magnetic train 'Transrapid' <i>G. Bohn and G. Steinmetz</i>	107
The vehicle Transrapid 06, specification and experiences under practical conditions <i>P. -J. Gaede</i>	115
Birmingham maglev: development for the future <i>M. G. Pollard and E. E. Riches</i>	123
Evaluation-module/suspension system installed on the HSST-03 vehicle <i>M. Kitamoto, S. Suzuki, M. Iwaya, J. Kato, M. Kawashima, and T. Shimada</i>	137
Integrated magnetic propulsion and suspension system technology <i>R. G. Gilliland, and J. J. Basic</i>	145
Fast acting magnets for transportation purposes <i>H. Weh and H. May</i>	155
A proposal of new structure for electromagnetic levitation system for trains <i>S. Yamamura and H. Yamaguchi</i>	165
Optimum control theory of a bogie-truck for damping rail oscillation and simulation for the running coupled rail cars <i>T. Nakagawa and S. Yamamura</i>	173

Mode coupling in maglev vehicles <i>P. K. Sinha</i>	179
Superconducting magnet for maglev train <i>Y. Jizo, Y. Furuta, H. Nakashima, and T. Iwahana</i>	185
On-board refrigeration system of magnetically levitated high speed trains MLU001 <i>H. Ohguma, T. Wada, H. Yamaji, A. Nakao, and H. Nakashima</i>	193
'Experimental studies of the superconducting split track' maglev system <i>J. L. Mahtani and R. G. Rhodes</i>	199
Transverse flux electrodynamic levitation system <i>J. F. Gieras</i>	207
A resonance-eliminated design of simply supported beam for a guideway of a high speed maglev system <i>M. Iguchi and H. Hara</i>	217
Steel guideways for electromagnetic high-speed transportation systems <i>H. G. Raschbichler and G. Schwindt</i>	225
Birmingham airport maglev—The development and design of the support structure and guideway <i>B. H. North</i>	237
Development of guideway for maglev <i>Y. Sato, A. Matsuura, S. Miura, and Y. Satoh</i>	243
Operation of the Transrapid test facilities in Emsland <i>F. Polifka</i>	251
Operational experience of Birmingham maglev <i>S. N. Mustow</i>	255
Ground facilities and operational experience of HSST-EXPO '85 <i>M. Kawashima, Y. Hosoda, T. Takada, M. Kitamoto, K. Mihirogi, M. Iwaya, A. Yamashashi, and I. Tatsumi</i>	263
Operational experience of JNR's maglev test train <i>H. Tanaka</i>	271
Demand potentials for maglev passenger transport in Europe <i>D. Eberlein</i>	277
The Transrapid maglev system <i>H. Heßler</i>	285
Feasibility studies for maglev connections in Germany <i>F. Polifka</i>	289
Safety aspects of the maglev test site Transrapid Versuchsanlage Emsland <i>H. Jansen and P. Mnich</i>	295
A feasibility study on electromagnetic systems and linear metro in Japan <i>M. Iguchi</i>	303
LIM driven subway railcar with small sectional area <i>Y. Shoyama, M. Ando, and H. Namikawa</i>	311
Running track of the linear motor car <i>T. Nishiki, Y. Akihama, T. Sakaguchi, Y. Ninagawa, M. Yamamiya, and M. Terada</i>	319