



APMF 2009

Asia-Pacific Symposium
on Measurement of Mass, Force and Torque

“SUPPORTING SAFETY AND CONFIDENCE”

*1st to 4th June 2009
Tokyo, Japan*

Sponsored by **SICE**
Co-sponsored by **IMEKO TC3**
Organized by **NMIJ/AIST**

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Introduction

Measurement technology on mass, force, torque constitutes an integral part of intellectual infrastructure for a diverse range of human activities such as quality and safety assurance of industrial products, fair trade, energy saving and environmental protection. The Asia-Pacific Symposium on measurement of mass, force and torque (APMF), since its initiation in 1992, has been offering participants the opportunity of exchanging the latest information on R&D in these fields and also extending friendships. It has been growing steadily as a not-to-miss event for metrologists, researchers and engineers especially those actively working in the Asia-Pacific region.

The APMF 2009 is scheduled to be held in Tokyo, Japan from June 1st to 4th, 2009. It is sponsored by the Society of Instrument and Control Engineers (SICE), co-sponsored by the International Measurement Confederation (IMEKO) TC3 and organized by the National Metrology Institute of Japan, a division of the National Institute of Advanced Industrial Science and Technology (NMIJ/AIST). We hope this symposium will be of help to the society by supporting safety and confidence through innovations in measurement technology.

The symposium will have contributions on the following topics regarding measurements in mass, force, torque and also density:

- Fundamental Aspects
- Development of Measurement Standards
- Evaluation of Measurement Uncertainty
- Instrumentation and Methods
- Applications in Industry
- Traceability, Inter-laboratory Comparisons
- Dissemination and Accreditation Issues

Registration Fees

Late Registration (by 29th May 2009):	JPY 60,000
(On-site Registration (Only in CASH):	JPY 70,000)
Technical visit on June 3 rd , 2009:	JPY 5,000
Technical visit on June 4 th , 2009:	JPY 5,000

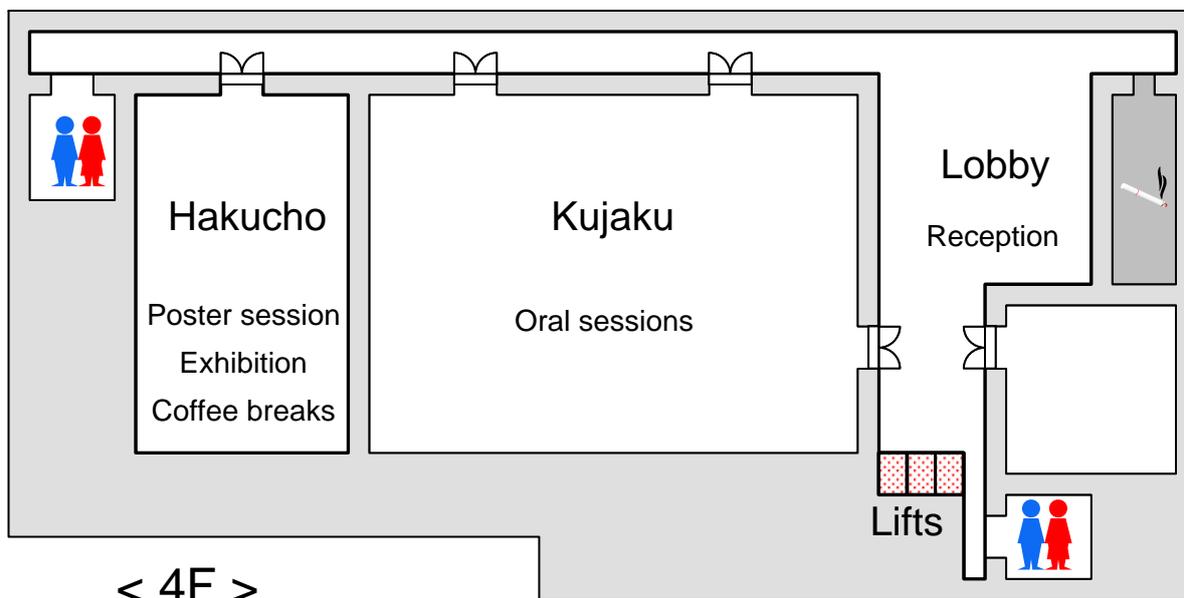
- **Those who are going to participate in the symposium should register on the APMF 2009 website (<http://www.sice.or.jp/~massforc/APMF2009/>) by 29th May 2009.**
- The registration fee includes a book of “Program & Abstracts”, symposium proceedings (full papers) on a CD, an identification badge that should be worn during the events, a bag, coffees, lunches, welcoming dinner and symposium dinner. It does not include those for the technical visits. However, please note that **those who will make on-site registration may not participate in the welcoming dinner.**
- Accompanying persons may participate in the welcoming dinner and the symposium dinner at a fee of JPY 20,000.
- The technical visit fee includes bus transportation from and back to the venue, an admission fee to a museum and a lunch on each day.

Venue

The venue is **Mielparque-Tokyo**, a 3-star hotel located near Tokyo Tower.

<http://www.mielparque.jp/tky/eng.html>

2-5-20 Shibakouen, Minato-ku, Tokyo 105-8582, Japan



- Wireless Internet connections will be provided in Hakucho room during the time period between morning and afternoon coffee breaks on each day. To use this, please prepare a laptop computer with IEEE 802.11b/g wireless host adapter and WPA-TKIP encoding. However, due to narrow VDSL line in the building, the Internet connections should be used only for sending/receiving e-mails or browsing simple web sites.

Accommodation

Some rooms are available in **Mielparque-Tokyo**, and there are **other hotels** of various ratings and rates within a walking distance of the venue. Contact information of these hotels is listed on our website. The participants are asked to arrange own accommodation by themselves with **directly contacting hotel receptionists** via e-mail, fax or phone. No responsibility will be taken by the APMF 2009 National Organizing Committee Members. Transport to and from the symposium venue, each day, is the responsibility of the symposium participants.

Language

All abstracts, manuscripts, presentation materials should be in **English**. No translation will be provided.

Technical Session (for Oral Presenters)

All presentations delivered orally will occupy a total slot of **20 minutes including introduction and discussions**. Please be punctual within this time slot.

All presentation materials should be prepared using **MS PowerPoint® (97-2003 or 2007)** or **some other software** for use with a data projector. A dedicated laptop computer will be available for uploading your presentation material prior to the symposium or your session. If you do not wish to transfer your presentation materials to the computer, you can directly run your presentation from your USB memory.

Any handouts, if desired, are the responsibility of the presenter.

Please be reminded that any overhead transparencies projector will **NOT** available at the symposium.

For more details, please visit our website.

Poster Session (for Poster Presenters)

Each poster will be posted on a panel of **900 mm in width** and 1800 mm in height having a usable area of **upper two thirds of the height (1200 mm)**. Two rolls of double-sided weak-adhesive tape will be provided for each poster. Magnets and pins are **NOT** acceptable.

Each poster should have the title of the paper, the names of authors and their affiliations at the top.

The posters can be kept posted for the first and the second days. Please be noted that the panels with the posters will be put away from the conference room to a storeroom over the first day night. Presenters are asked to remove their posters after the session on the second day. Posters not removed by the second day evening will be taken down and discarded.

Technical Tour

- **Technical Tour I on June 3rd (Wed)** will go around the central part of Tokyo.
 - Tokyo works of the mint bureau
 - Top floor in a high-rise office building of the Tokyo metropolitan government
 - Edo-Tokyo museum of history
- **Technical Tour II on June 4th (Thu)** will make an excursion to Tsukuba city located approximately 60 km northeast of Tokyo.
 - NMIJ/AIST (Labs of mass, force, torque and density standards)
 - Brewery of a major brewery company

Symposium Program

Date	Time	Activity
June 1 (Mon)	08:40 - 09:40	Registration
	09:40 - 10:40	Opening Ceremony Plenary Session
	10:40 - 11:10	Commemorative Photograph Coffee Break
	11:10 - 12:10	Technical Session (Density & Viscosity)
	12:10 - 13:20	Lunch
	13:20 - 15:20	Technical Session (Mass)
	15:20 - 15:50	Coffee Break
	15:50 - 16:50	Products Introduction Session
	18:00 - 21:00	Welcome Dinner (Tokyo Bay Cruise)
June 2 (Tue)	09:00 - 10:20	Technical Session (Force I)
	10:20 - 10:50	Coffee Break
	10:50 - 12:10	Technical Session (Force II)
	12:10 - 13:20	Lunch
	13:20 - 14:40	Poster Session
	14:40 - 15:10	Coffee Break
	15:10 - 16:30	Technical Session (Torque)
	16:30 - 16:40	Closing Ceremony
	18:00 - 20:00	Symposium Dinner
June 3 (Wed)	09:00 - 17:00	Technical Tour I (Tokyo)
June 4 (Thu)	09:00 - 18:00	Technical Tour II (Tsukuba)

- June 1st (Mon) -**Plenary Session**

Chair Person: Mr. Kazunaga Ueda

09:50 ~ 10:40	Present State of the Avogadro Constant Determination from Si Isotope Enrichment Kenichi Fujii <i>National Metrology Institute of Japan, AIST, Japan</i>
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Technical Session: Density and Viscosity

Chair Person: Dr. Lee Shih Mean

11:10 ~ 11:30	The Immersing Effect of Hanging Structure in Density Measurement Feng-Yu Yang, Sheau-shi Pan and Sheng-Jui Chen <i>Center for Measurement Standards (CMS), Industrial Technology Research Institute (ITRI), Hsinchu, Taiwan, R.O.C.</i>
11:30 ~ 11:50	Improvement of Mass Measurement of Hydrometer Calibration in Air and Reference Liquid by Using a Novel Loader Yong Jae Lee and Kyung Ho Chang <i>Mass and Force Center, Physics Metrology Division, Korea Research Institute of Standards, Daejeon, Rep. of Korea</i>
11:50 ~ 12:10	Technological Background and Latest Market Requirements concerning "Static Viscosity" Measurement with a Tuning-fork Vibration Viscometer Naoto Izumo and Atsushi Koiwai <i>R&D Division, A&D Company, Limited., Toshima-ku, Tokyo, Japan</i>

Technical Session: Mass

Chair Persons: Mr. Masaaki Ueki and Dr. Jin Wan Chung

13:20 ~ 13:40	Innovative Weighing Solution to Support Weighing Small Samples on Laboratory Balances Yoshikazu Watabe ¹ , Yoichiro Takayanagi ¹ and Arthur Reichmuth ² ¹ <i>Mettler-Toledo K.K., Japan</i> ² <i>Mettler-Toledo AG, Switzerland</i>
13:40 ~ 14:00	Establishment of Mass Standards from 1 mg to 50 µg Jin Wan Chung, Sungjun Lee and Kwang-Pyo Kim <i>Division of Physical Metrology, Korea Research Institute of Standards and Science (KRISS), Daejeon, Rep. of Korea</i>
14:00 ~ 14:20	Determining the Optimal Number of Weighing Cycles Experimentally for High Precision Reference Standard Mass Calibration Lee Shih Mean and Lim Lee Kwee <i>National Metrology Centre (NMC), Agency for Science Technology and Research (A-STAR), Singapore</i>
14:20 ~ 14:40	Establishment of a Mass Scale in the Range from 1 g to 1 kg by the Sub-multiple Calibration Method Masaaki Ueki, Shigeki Mizushima, Jianxin Sun and Kazunaga Ueda <i>National Metrology Institute of Japan, AIST, Japan</i>
14:40 ~ 15:00	Simplification of Structure and Improvement of Weighing Accuracy for Multi-hopper Isao Nakagiri ¹ and Toru Kohashi ² ¹ <i>Industrial scale design section, Yamato Scale Co., Ltd, Akashi, Japan</i> ² <i>Technical headquarters, Yamato Scale Co., Ltd, Akashi, Japan</i>
15:00 ~ 15:20	The Estimation Method of Mass and Center of Gravity of the Carried Object with Robot Arms Yoshihiro Fujioka and Takashi Ito <i>Dept. of Mechanical Engineering, Matsue College of Technology, Matsue, Japan</i>

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Products Introduction Session

Chair Person: Dr. Takanori Yamazaki

15:50 ~ 16:05	Ishida Co., Ltd.
16:05 ~ 16:20	Mettler-Toledo K.K.
16:20 ~ 16:35	Sartorius Mechatronics Japan K.K.
16:35 ~ 16:50	Spectris Co., Ltd.

- June 2nd (Tue) -

Technical Session: Force I

Chair Person: Mr. Kazunaga Ueda

09:00 ~ 09:20	Design and Structure of New 1.5 kN and 5 kN Deadweight Force Standard Machine and Result of Comparison with 100 kN Deadweight Force Standard Machine Kittipong Chaemthet, Chanchai Amornsakun, Noppadol Sumyong and Veera Tulasombut <i>National Institute of Metrology, Thailand (NIMT), Thailand</i>
09:20 ~ 09:40	New Deadweight Force Standard Machines of KRISS Yon-Kyu Park, Hou-Keun Song, Min-Seok Kim, Jong-Ho Kim, Jeong-Tae Lee, Ho-Young Lee and Dae-Im Kang <i>Center for Mass & Force, Div. of Physical Metrology, KRISS, Rep. of Korea</i>
09:40 ~ 10:00	The Establishment of 100 kN Deadweight Force Standard Machine Zhang Zhimin, Wu Kun, Jiang Ximing, Zhang Yue and Hu Gang <i>Mechanics and Acoustics Division, National Institute of Metrology (NIM), P. R. China</i>
10:00 ~ 10:20	Internal Large Force Comparison in China Hu Gang, Zhang Zhimin and Zhang Yue <i>Mechanics and Acoustics Division, National Institute of Metrology, Beijing, P. R. China</i>

Technical Session: Force II

Chair Person: Ms. Zhang Zhimin

10:50 ~ 11:10	Capacitive Position Sensor Developed for Measuring Force at Nanonewton Scale Sheng-Jui Chen and Sheau-Shi Pan <i>Center for Measurement Standards, Industrial Technology Research Institute, Taiwan, R.O.C.</i>
11:10 ~ 11:30	Portable Dynamic Force Measurement Equipment Meng Feng, Tang Gefei and Zhang Zhimin <i>National institute of metrology, Beijing, P. R. China</i>
11:30 ~ 11:50	Analogy Observation of Force Transducers Compared to Strain and Pressure Transducers Based on Foil Type Strain Gauges and the Piezoelectric Principle Andre Schaefer and Thomas Kleckers <i>Hottinger Baldwin Messtechnik GmbH, Darmstadt, Germany</i>
11:50 ~ 12:10	Concurrent Monitoring of In-plane Strain and Out-of-plane Displacement of Tires using Digital Image Correlation Method Naoki Hiraoka, Ryosuke Matsuzaki and Akira Todoroki <i>Tokyo Institute of Technology, Japan</i>

Poster Session

Mass	Characteristic Evaluation of Weights Based on OIML R111 Noboru Murakami and Noboru Ito <i>Murakami koki Co., Ltd., Osaka, Japan</i>
Mass	Research of Influence Quantity on Magnetic Susceptometer Wang Jian, Yao Hong, Zhang Yue, Cai Changqing, Ding Jingan and Zhong Ruilin <i>National Institute of Metrology, Beijing 100013, P. R. China</i>
Mass	Domestic Mass Comparison on Multiple and Sub-multiple of 1 kg in China Yao Hong ¹ , Ding Jing'an ¹ and Huang Jian ² ¹ <i>Mass Standard Lab, Mechanical and Acoustic Metrology Division, NIM, P. R. China</i> ² <i>Mechanical Metrology Division, YITM, P. R. China</i>
Mass	Research on Calibration for Non-automatic Weighing Instruments Zhong Ruilin, Cai Changqin, Ding Jin'an, Zhang Yue, Yao Hong and Wang Jian <i>Mechanics & Acoustics Division, National Institute of Metrology, P. R. China</i>
Mass	Frequency-estimation Method for Axle Weights of In-motion Vehicles Naoto Nishijima ¹ , Toshitaka Umemoto ¹ and Yasumasa Sato ² ¹ <i>Osaka Prefectural College of Technology, Neyagawa, Japan</i> ² <i>Yamato Scale Co., Ltd., Akashi, Japan</i>
Mass	Improvement of Accuracy for Continuous Mass Measurement in Cheakweighters with an Adaptive Notch Filter - The Possibility of the Measurement in Steady Time - Toshifumi Mizui ¹ , Toshitaka Umemoto ¹ , Morihito Kamon ² and Yoichiro Kagawa ² ¹ <i>Osaka Prefectural College of Technology, Neyagawa, Japan</i> ² <i>Yamato Scale Co., Ltd., Akashi, Japan</i>
Mass	Axle Weighing of In-motion Vehicles with High Velocity Using Higher Order FIR Filters Kengo Fukuda ¹ , Koji Yoshida ² , Tetsuya Kinugasa ² , Shinsaku Fujimoto ³ , Kazuhito Kanazawa ⁴ and Toshiro Ono ⁵ ¹ <i>Oyo Measurement Co., Ltd., Osaka, Japan</i> ² <i>Dept. of Mechanical Systems Engineering, Okayama University of Science, Okayama, Japan</i> ³ <i>Dept. of Intelligent Mechanical Engineering, Okayama University of Science, Okayama, Japan</i> ⁴ <i>Hanshin Expressway Co., Ltd., Osaka, Japan</i> ⁵ <i>Professor emeritus of Osaka Prefecture University, Osaka, Japan</i>
Mass	Improvement of Accuracy for Length Measurement System on Conveyor Belt Akihiro Watanabe ¹ , Takanori Yamazaki ² , Hideo Ohnishi ³ , Masaaki Kobayashi ³ and Shigeru Kurosu ⁴ ¹ <i>Gunma University, Japan</i> ² <i>Oyama National College of Technology, Japan</i> ³ <i>Shinko Co., Ltd., Japan</i> ⁴ <i>Reserach Inst. Crotech, Japan</i>
Force	Application of an Automatic Rotation Device to Existing Force Standard Machines Toshiyuki Hayashi, Yoshihisa Katase, Hiroshi Maejima, Yukio Yamaguchi and Kazunaga Ueda <i>National Metrology Institute of Japan (NMIJ), AIST, Japan</i>
Force	Piezoresistive Cantilever as a Micro Force Transfer Artifact Min-Seok Kim ¹ , Jae-Hyuk Choi ² , Jong-Ho Kim ¹ and Yon-Kyu Park ¹ ¹ <i>Mass and Force Center, Korea Research Institute of Standards and Science, Daejeon, Rep. of Korea</i> ² <i>Quantum Metrology Center, Korea Research Institute of Standards and Science, Daejeon, Rep. of Korea</i>

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Force	Measurements of Skin Elastic Constants for the Palpation in an Oriental Medicine Han Wook Song, Yon Kyu Park, SungJun Lee and Sam Yong Woo <i>Center for Mass & Force, Div. of Physical Metrology, KRISS, Rep. of Korea</i>
Force	The Development of a Precise Starting Sensor with Strain Gauges Offering Performance Improvement for Short Distance Athletic Sports Jeong Tae Lee ¹ , Han Wook Song ¹ , Yon Kyu Park ¹ and Cheong Hwan Oh ² ¹ <i>Center for Mass & Force, Div. of Physical Metrology, KRISS, Rep. of Korea</i> ² <i>Chungnam National University, Rep. of Korea</i>
Density	Automatic Calibration System for Glass Hydrometers by Vision System Min-Soo Lee, Jae Hoon Choi and Wan Soo Chung <i>Standards & Measurement Center, KTL, Rep. of Korea</i>

Technical Session: Torque

Chair Person: Dr. Yon-Kyu Park

15:10 ~ 15:30	Digital Signal Processing in High Precision Torque Measurement Systems Sven Kuhn <i>Hottinger Baldwin Messtechnik GmbH, Darmstadt, Germany</i>
15:30 ~ 15:50	Development of Control Systems for 10 N•m Dead Weight Torque Standard Machine Atsuhiko Nishino, Koji Ogushi and Kazunaga Ueda <i>National Metrology Institute of Japan, AIST, Japan</i>
15:50 ~ 16:10	The International Verification for 50 kNm Torque Standard Machine Li Tao ¹ , Chen Yongpei ¹ , Dai Ming ¹ , Lin Jing ¹ , Hu wei ¹ and Lv Shi ² ¹ <i>Shanghai Marine Equipment Research Institute, Shanghai, P. R. China</i> ² <i>Beijing 91635, Beijing, P. R. China</i>
16:10 ~ 16:30	Confirming Accuracy Evaluation of Unsupported Beam Derived from Based Unit by Direct Comparison with Torque National Standard Tassanai Sanponpute, Chokchai Wattong, Nattapon Saenkhum and Nittaya Arksonnarong <i>Torque Laboratory, Department of Mechanical Metrology, National Institute of Metrology (Thailand), Thailand</i>

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Further Information

Please visit our website at:

<http://www.sice.or.jp/~massforc/APMF2009/>

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